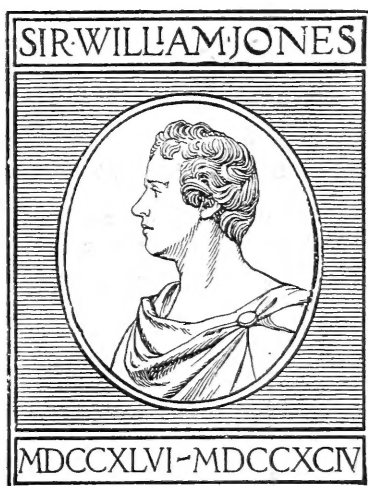


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# JOURNAL

## OF THE

# ASIATIC SOCIETY OF BENGAL.

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. S. GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 16.

The present contribution commences with an account of the genus *Psychotria*, which concludes the Natural Order *Rubiaceæ*. In addition, it contains accounts of the Natural Orders *Valerianæ* and *Compositæ* (prepared by Sir G. King); *Stylidiæ*, *Goodenoviæ*, and *Campanulaceæ* (prepared by Mr. Gamble); *Vacciniaceæ* and *Ericaceæ* (Sir G. King); *Epacrideæ* and *Plumbagineæ* (Mr. Gamble). For the new genera and species proposed in these Orders the authors are jointly responsible. The account of the Order *Monotropeæ* has been supplied by Lieut.-Col. Prain, F.R.S., Superintendent of the Royal Botanic Garden, Calcutta; and that of the Order *Gentianeæ* has been added, having been drawn up by Mr. C. B. Clarke, F.R.S., late President of the Linnean Society of London. It is somewhat out of its proper sequence, but has been included, as the descriptions were ready for publication.

In addition, therefore, to the account of the Rubiaceous genus *Psychotria*, with 29 Malayan Peninsular species, of which 11 are new to science, this fasciculus contains accounts of the Malayan members of 11 Natural Orders, including 48 genera and 81 species, of which 2 genera and 17 species are new to science.

Nat. Ord. LIX. RUBIACEÆ.

53. PSYCHOTRIA, Linn.

Shrubs or small trees, erect or occasionally climbing or twining; rarely herbs. *Leaves* opposite, rarely in whorls of 3 or 4. *Stipules* free in pairs, or connate, often with glands or hairs, deciduous or persistent. *Flowers* rather small, in terminal, rarely axillary, cymes

corymbs or fascicles, bracteolate or not, never involucrate (in the Malayan species). *Calyx-tube* short; the limb persistent in part or deciduous. *Corolla-tube* straight, short; the throat naked or hairy; the lobes of the mouth 5, rarely 4 to 6, valvate in bud. *Stamens* as many as the corolla-lobes, inserted on the throat or mouth; anthers linear or obtuse, attached dorsally near the base to short or long filaments. *Ovary* 2-celled; style long or short, bifid; ovules often cuneiform, solitary, erect from the base of each cell. *Fruit* small, baccate or drupe-like, ovoid globose or oblong, smooth or ridged, composed of two plano-convex, 1-celled, 1-seeded pyrenes; or didymous and separating into two cocci. *Seeds* plano-convex, the ventral surface grooved or plane, the dorsal smooth, ridged or sulcate; testa thin, albumen hard; embryo small, basal; cotyledons broad, thin; radicle inferior.—DISTRIB. Species about 550; tropical or sub-tropical.

Scandent :—

Flowers 4-merous :—

Panicles lax; leaves elliptic- or oblong-lanceolate .. 1. *P. laxiflora*.

Flowers 5-merous :—

Seeds with 4 ridges on the dorsal surface, the ventral surface plane :—

Flowers sessile in small capitula at the ends of the branches of the cymes :—

Leaves ovate to oblong-elliptic, 1·75 to 2·5 in. broad; inflorescence puberulous .. .. 2. *P. morindæflora*.

Leaves narrowly elliptic, less than 1·25 in. broad; inflorescence coarsely pubescent .. .. 3. *P. Mainingayi*.

Flowers pedicellate in cymosely branched cymes :—

Leaves elliptic-oblong to elliptic, the midrib sometimes pubescent on the lower surface, otherwise glabrous; main-nerves 7 to 10 pairs; petioles ·4 to ·75 in. long; fruit ·25 in. long .. .. 4. *P. sarmentosa*.

Leaves narrowly elliptic-oblong, main-nerves 4 to 6 pairs; petioles ·4 to ·8 in. long; fruit ·35 in. long .. 5. *P. Kunstleri*.

Leaves broadly obovate or sub-ovate; main-nerves 5 to 10 pairs; petioles ·5 to 1·5 in.; fruit ·4 in. long .. 6. *P. penangensis*.

Seeds with 3 ridges on the dorsal surface, the ventral surface plane :—

Flowers pedicellate, in cymosely branched paniculate cymes; fruit narrowly ellipsoid .. .. 7. *P. Scortechinii*.

Flowers on short pedicels in globular cymes at the ends of the branches of the panicles :—

Leaves and stems glabrous; fruit subglobose, ·2 in. long .. .. 8. *P. pilulifera*.

Leaves and stems and inflorescence rusty-pubescent .. 9. *P. ovoidea*.

Seeds with more than 4 ridges on both dorsal and ventral surfaces .. .. 10. *P. Ridleyi*.

Seeds faintly ridged on the dorsal surface, the ventral surface with a shallow groove .. .. 11. *P. polycarpa*.

Erect shrubs, usually small:—

Flowers 4-merous:—

Leaves with a strong pale intra-marginal nerve .. 12. *P. calocarpa*.

Flowers 5-merous:—

Flowers shortly pedicellate, in dense globular cymules at the ends of the long-peduncled branches of a terminal umbellate cyme; leaves deciduously puberulous, with 9 to 13 pairs of main-nerves; fruit 3 in. long; seeds 4-ridged on the dorsal surface, slightly concave on the ventral .. .. 13. *P. multicapitulata*.

Flowers sub-sessile, in short condensed dichotomous sessile axillary cymes; leaves with scurfy pubescence and 8 to 11 pairs of main-nerves; seeds 5-ridged on the dorsal and broadly grooved on the ventral surface .. 14. *P. tortilis*.

Flowers in a terminal umbellately branching cyme:—

Seeds with a single dorsal ridge, the ventral surface plane:—

Leaves quite glabrous:—

Leaves 6 to 10 in. long; main-nerves 12 to 15 pairs .. 15. *P. Griffithii*.

Leaves usually under 6 in. long, main-nerves 8 to 10 pairs .. 16. *P. angulata*.

Leaves adpressed-pubescent, 6 to 12 in. long .. 17. *P. Helferiana*.

Seeds with a single dorsal ridge, the ventral surface with a groove; leaves 5 to 8 in. long, quite glabrous, main-nerves 7 to 8, rarely 10 pairs .. 18. *P. montana*.

Seeds with 5 ridges on the dorsal surface, the ventral surface plane:—

Leaves glabrous:—

Leaves oblong-elliptic to oblanceolate-elliptic, 3·5 to 8 in. long; fruit 25 in. long .. 19. *P. viridiflora*.

Leaves softly pubescent:—

Leaves elliptic to elliptic-oblong, the bases cuneate rounded or cordate, 3·5 to 5 in. long; fruit 25 to 3 in. long .. 20. *P. Birchiana*.

Leaves elliptic, the upper surface glabrous except the midrib, 5 to 7 in. long; fruit 45 in. long .. 21. *P. fulva*.

Seeds 5-ridged on the dorsal surface and 2-grooved on the ventral; leaves glabrous on the upper surface, their margins crenulate .. 22. *P. fulvoidea*.

Seeds with 5 ridges on the dorsal surface and 1 ridge on the ventral; leaves glabrous, usually oblanceolate 23. *P. stipulacea*.

Seeds 4-ridged on the dorsal surface, plane on the ventral:—

Leaves elliptic, tapering equally to each end, 9- to 10-nerved; calyx-lobes very long caudate-acuminate 24. *P. Curtisii*.

Leaves obovate-oblong or obovate-oblanceolate, 10- to 14-nerved; calyx-lobes short, broad, blunt .. 25. *P. rhinocerotis*.

Seeds with 4 ridges on the dorsal surface and a faint groove on the ventral; leaves elliptic or elliptic-lanceolate, 12- to 18-nerved .. .. 26. *P. malayana*.

## SPECIES IMPERFECTLY KNOWN.

*Psychotria Wrayi*, No. 27.

„ *inaequalis*, No. 28.

„ *condensa*, No. 29.

1. *PSYCHOTRIA LAXIFLORA*, Blume Bijdr. 964. Scandent or epiphytic, glabrous except the inflorescence; young branches slightly thicker than a crow-quill, terete, dark-coloured, brown, shining. *Leaves* membranous, narrowly elliptic- or oblong-lanceolate, much acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the lower the paler, midrib distinct; main-nerves 4 to 6 pairs, faint, curved, ascending; length 2 to 4 in.; breadth .5 to 1 in.; petiole .15 to .2 in. long. *Stipules* forming a tube from .15 to .3 in. long, sharply toothed. *Panicles* solitary, terminal, lax, more than half as long as the leaves, on naked peduncles about 1 in. long; branches cymose, with small acute bracteoles at their bases, puberulous. *Flowers* .15 to .2 in. long, puberulous, in cymules of three at the ends of the branchlets; their pedicels short, with broad acute caducous bracteoles at their bases. *Calyx* shortly funnel-shaped, the mouth sub-truncate or obscurely 4 toothed. *Corolla* longer than the calyx, broadly clavate in bud, funnel-shaped; the mouth with 4 broad obtuse lobes, throat sericeous. *Anthers* 4, elliptic, blunt, sub-sessile. *Fruit* clavate-ellipsoid, with 8 vertical ridges (2 of them double), glabrous; seeds with 4 bold ridges on the dorsal surface; the ventral surface quite flat. Miq. Fl. Ind. Bat. II. 187.

SINGAPORE: *Ridley* 13, 4828. JOHORE: *Ridley*. PERAK: *King's Collector* 4117, 8428; *Wray* 110.—DISTRIB. Sumatra, *Forbes* 1297, 1309, 1710, 2466; Java, *Koorders* 23550B.

2. *PSYCHOTRIA MORINDEFLORA*, Wall. Cat. 8438 A.B.C. in part. A woody climber, 15 to 20 feet long, glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, dark brown when dry, terete, somewhat thickened at the nodes, the internodes minutely lenticellate and faintly striate. *Leaves* coriaceous, ovate to elliptic, sometimes oblong-lanceolate, shortly and rather bluntly acuminate, the base slightly cuneate or rarely rounded; upper surface olivaceous-greenish when dry, the lower purplish-brown; the midrib channelled on the upper surface, prominent on the lower; main-nerves 6 to 8 pairs, rather straight, spreading, thin but rather distinct on both surfaces when dry; length 3 to 4.5 in.; breadth 1.75 to 2.5 in.; petiole

·2 to ·5 in. *Stipules* caducous, leaving a pale narrow scar between the petioles. *Cymes* terminal, about 2 in., rarely 3 in. long; the branches compressed and angled, scurfy-puberulous, two of them springing from the base, the other three umbellate at the apex of the main axis, each bearing at its apex a dense, many-flowered, minutely bracteolate capitulum less than ·5 in. in diam. *Flowers* ·2 in. long, sessile. *Calyx* cupular, the mouth with 5 small blunt teeth. *Corolla* twice as long as the calyx; the mouth with 5 deep oblong blunt lobes; throat densely sericeous. *Anthers* 5, short, elliptic, basifixed on stout filaments. *Style* cylindric, thickened upwards; stigma of 2 broad lobes. *Fruit* short, compressed ovoid-elliptic, with 8 vertical ridges (2 of them double) crowned by the small calyx, ·25 in. long and ·15 in. in diam. from front to back; seeds with 4 dorsal ridges; ventral surface plane. Hook. fil. Fl. Br. Ind. III. 166. *Psychotria*? Wall. Cat. 8355.

PERAK: *King's Collector* 2585, 2665; *Scortechini* 1826; *Wray* 4001.  
PENANG: *Wallich*; *Curtis* 478.

3. *PSYCHOTRIA MAINGAYI*, Hook. fil. Fl. Br. Ind. III. 166. A slender woody climber; young branches half as thick as a goose-quill, pubescent, ultimately pale and glabrous. *Leaves* thickly membranous, narrowly elliptic, caudate-acuminate, the base much narrowed; both surfaces glabrous, when dry pale olivaceous, the upper rather the darker; main-nerves about 6 pairs, indistinct on both surfaces like the midrib; length 2 to 3·25 in.; breadth ·65 to 1·2 in.; petiole ·1 to ·2 in., slender. *Stipules* cartilaginous, persistent, connate into a tube ·15 in. long with a few hairs at the truncate and toothed or acute apex. *Cymes* axillary, on slender, compressed, coarsely pubescent peduncles shorter than the leaves, few-branched. *Flowers* sessile, bracteoles linear. *Calyx* much longer than the pubescent ovary, widely campanulate; the lobes ovate-triangular, caudate-acuminate, spreading. *Corolla* unknown. *Fruit* broadly ellipsoid, with 8 deep vertical grooves, pale, nearly glabrous when ripe, ·2 in. long.

SINGAPORE: *Maingay* (K.D.) 926; *Ridley* 6924.

4. *PSYCHOTRIA SARMENTOSA*, Blume Bijdr. 964. Scandent; woody; young stems thinner than a goose-quill, pale, glabrous. *Leaves* thinly coriaceous, elliptic-oblancoelate to elliptic, acute or shortly and abruptly acuminate, much narrowed at the base, edges slightly recurved; both surfaces pale brown tinged with olivaceous when dry, minutely reticulate; the upper glabrous, the lower sometimes pubescent only on the stout midrib; main-nerves 7 to 10 pairs, curving slightly upwards, faint; length 2·5 to 4 in.; breadth 1 to 1·75 in.; petioles ·4 to ·75 in., winged above. *Stipules* broad at the base, the apex caudate-acuminate.



*Cymes* terminal, puberulous, shorter than the leaves, on short peduncles, cymosely branched; the branches angled, spreading, many-flowered; bracteoles minute, linear. *Flowers* about .15 in. long, puberulous outside, on short pedicels. *Calyx* campanulate, with 5 short triangular teeth. *Corolla* villous at the base in the interior. *Fruit* ellipsoid, .25 in. long, with 10 vertical ridges (2 of them double). *Seeds* with 4 dorsal ridges, the ventral surface plane. DC. Prod. IV. 522; Wight Ic. 1038; Thwaites Enum. Pl. Ceyl. 148; Kurz For. Fl. Burm. II. 14; Hook. fil. Fl. Br. Ind. III. 165. *P. obovata*, Wall. Cat. 8380. *Grumilea Junghuhniana*, Miq. Fl. Ind. Bat. II. 296. *Psychotria* sp., Wall. Cat. 8382, 8352 ?, 8384.

SINGAPORE: *Ridley* 2874, 2875, 9112. MALACCA: *Griffith* (K.D.) 3043. PERAK: *King's Collector* 4967, 7572. PENANG: *King* 1346; *Curtis* 951, 2781.—DISTRIB. Burma, *Wallich*; *Helfer* (K.D.) 3041, &c.; Indian Peninsula; Ceylon; Malay Archipelago; Andaman Islands.

VAR. *pachyphylla*, King & Gamble. *Leaves* thickly coriaceous, shining, greenish when dry, 3 to 4 in. long; fruit .25 in. long, subglobular.

PENANG: *Ridley* 9363; *Curtis* 2215.

5. *PSYCHOTRIA KUNSTLERI*, n. sp., King & Gamble. A glabrous epiphyte with slightly angled stems thinner than a goose-quill, pale yellowish when dry. *Leaves* succulent, glossy and bluish-green when fresh, but yellow on both surfaces and dull when dry, narrowly elliptic-oblong, rarely oblong-oblongeolate, gradually and equally tapering to each end; the midrib bold, channelled on the upper surface; main-nerves 4 to 6 pairs, spreading, very indistinct; length 3 to 5.5 in.; breadth .8 to 1.4 in.; petioles .4 to .8 in. long. *Stipules* forming a cartilaginous persistent cup with an entire mouth, about .1 in. long. *Cyme* solitary, umbellate, terminal, longer than the leaves (the naked peduncle of 2 to 3 in. being included), lax, from 2 to 4 in. broad; branches spreading, dividing near their apices into umbellate cymes; bracteoles few, linear, acute. *Flowers* not seen: on basally bracteolate pedicels as long as themselves. *Fruit* .35 in. long, ellipsoid, deeply 10-grooved, crowned by the rather large remains of the 5-toothed calyx, 10-ridged. *Seeds* dorsally 4-ridged, the ventral surface flat.

PERAK: *Scortechini*; *King's Collector* 1886, 4953, 6588; *Wray* 2230.—DISTRIB. Sumatra, *Forbes* 2823.

6. *PSYCHOTRIA PENANGENSIS*, Hook. fil. Fl. Br. Ind. III. 175. A shrubby epiphyte or climber, 8 to 12 feet long, all parts except the inflorescence glabrous; young branches slightly compressed, thinner than a goose-quill, dark-coloured. *Leaves* thinly coriaceous, broadly elliptic-obovate or sub-ovate, shortly and abruptly triangular, acuminate.

nate, much narrowed at the base into the broad petiole; both surfaces brown when dry, the upper slightly olivaceous; the midrib broad, channelled on the upper surface, main-nerves 5 to 10 pairs, spreading, thin, distinct on the lower surface; length 3 to 4·5 in.; breadth 1·5 to 2·5 in.; petiole ·5 to 1·5 in. long, slightly winged above. *Stipules* broadly ovate, sub-acute or blunt, sub-tubular, sometimes bifid, ·2 to ·4 in. long. *Cymes* umbellate, solitary or terminal, pedunculate, as long as or longer than the leaves (including the compressed naked 1 to 2 in. long peduncle); primary branches long, spreading; the ultimate umbels with broad-based subulate unequal bracteoles. *Flowers* ·2 to ·25 in. long, sessile or on short pedicels; bracts ·25 in. long. *Calyx-tube* obconic, its teeth triangular. *Corolla* longer than the calyx, shortly and widely tubular, deeply divided into 5 broad lobes thickened near the apex, the apex itself sharp and inflexed, glabrous inside except for the ring of hair in the throat at the insertion of the short filaments. *Anthers* elliptic, blunt, entire. *Fruit* ellipsoid, compressed, with 10 obtuse vertical ridges (2 of them double), glabrescent, crowned by the rather large calyx; length ·4 in.; breadth ·25 in. *Seeds* 2, plano-convex, the dorsal surface with 4 blunt ridges, the ventral surface plane.

MALACCA: *Maingay* (K.D.) 920. SINGAPORE: *Ridley* 2870. PERAK: *Scortechini* 2034; *King's Collector* 3049, 4591, 10723. SELANGOR: *Ridley* 7425. PANGKORE: *Curtis* 1621.

7. *PSYCHOTRIA SCORTECHINII*, n. sp., King & Gamble. A climber, all parts glabrous; young branches pale brown, thicker than a crow-quill, terete, smooth. *Leaves* membranous, ovate-lanceolate or narrowly elliptic, acuminate, the base narrowed or rarely rounded; both surfaces brown when dry (the lower slightly paler), the midrib prominent; main-nerves 5 or 6 pairs, curved, spreading, not prominent; length 2·5 to 4 in.; breadth 1 to 1·5 in.; petiole ·15 to ·2 in. *Stipules* oblong, acute, connate at their bases, ·15 to ·2 in. long, caducous. *Cymes* paniculate, solitary, terminal, rarely axillary, spreading, lax, cymosely branched, in flower as long as or nearly as long as the leaves, in fruit longer, the branches bracteolate, angled, divaricating. *Flowers* on the ultimate branchlets in threes, ·15 in. long, on short pedicels, each with a bracteole at the base. *Calyx* cupular, with 5 short acute teeth. *Corolla* longer than the calyx, cylindric, with short triangular lobes, the throat with tufts of yellowish hairs between the 5 stamens. *Anthers* on short filaments. *Style* cylindric, stigma 2-lobed. *Fruit* narrowly ellipsoid, tapering to each end, sometimes clavate, slightly compressed, 8-ridged (2 being double), crowned by the calyx, ·35 in. long and ·2 in. in diam. *Seeds* with 3 broad dorsal ridges, ventral surface plane.

PERAK: *Scortechini* 311, 404, 426; *King's Collector* 897, 2566, 5373.

This closely resembles *P. laxiflora*, Bl., but has 5-merous flowers and longer, less clavate fruit.

8. *PSYCHOTRIA PILULIFERA*, n. sp., King & Gamble. A small tree or climber; all parts except the inflorescence glabrous; young branches about as thick as a crow-quill, terete, pale brown when dry. *Leaves* coriaceous, narrowly elliptic, much tapered to both ends; both surfaces olivaceous when dry, the lower slightly the paler; main-nerves 6 or 7 pairs, inconspicuous, the midrib bold beneath when dry; length 2·5 to 3·5 in.; breadth ·75 to 1 in.; petiole ·35 to ·4 in. long, slender. *Inflorescence* a terminal, few-branched, puberulous panicle of condensed 8–10-flowered globular cymes. *Flowers* and their short pedicels minutely tomentose. *Calyx* shortly campanulate, the mouth with 5 spreading triangular acute lobes. *Corolla* tubular; the lobes oblong, broad, with small inflexed apices. *Anthers* 5, attached to the throat by short filaments surrounded by coarse hair. *Fruit* sub-globose, with 10 bold vertical ridges (2 of them double), crowned by the small calyx, ·2 long and ·15 in. in diam. *Seeds* with 3 bold ridges on the dorsal surface; ventral surface plane.

PERAK, at elevations of 3,000 to 5,000 feet: *Wray* 287, 398, 434, 946, 3870.

9. *PSYCHOTRIA OVOIDEA*, Wall. Cat. 8383. A slender woody climber, 20 to 40 feet long; stems thinner than a goose-quill, densely rusty-pubescent. *Leaves* with recurved margins, coriaceous, ovate- or elliptic-lanceolate, shortly acuminate, the base cuneate or rounded, sometimes minutely cordate; upper surface olivaceous when dry, glabrous, the main-nerves depressed; the lower brown, pubescent on the stout midrib and 5 to 7 pairs of prominent curved ascending main-nerves, puberulous on the interspaces; length 1·5 to 2·5 in.; breadth ·85 to 1·25 in.; petioles ·15 to ·25 in. long. *Stipules* connate, ovate-lanceolate, ·25 in. long, caducous. *Cymes* ·75 to 2 in. in diam., trichotomous, solitary, terminal, rusty-pubescent, on angled peduncles ·5 to 1 in. long. *Flowers* about ·15 in. long, on short pedicels, crowded in dense cymes at the ends of the branches and mixed with linear bracteoles. *Calyx* campanulate, with 5 spreading acute teeth. *Corolla* twice as long as the calyx, salver-shaped, with 5 lobes, the tube villous inside. *Fruit* ovoid-globose, ·15 in. long, the apex crowned by the calyx, the sides with 6 faint vertical ridges. *Seeds* faintly 3-ridged on the dorsal surface; the ventral surface broad, flat. Hook. fil. Fl. Br. Ind. III. 166.

SINGAPORE: *Wallich*, *Seeman* 2348. MALACCA: *Maingay* (K.D.) 923; *Ridley* 97, 8407.

10. *PSYCHOTRIA RIDLEYI*, n. sp., King & Gamble. A small shrub; all parts glabrous except the inflorescence; stems half as thick as a goose-quill, terete, greenish when dry. *Leaves* membranous, oblong-to elliptic-oblongate, the apex abruptly and very shortly acuminate, the base much narrowed, both surfaces pale olivaceous when dry, the midrib rather prominent, the upper sometimes with scattered minute, adpressed white hairs; main-nerves 7 to 9 pairs, slightly curved, spreading, faint on both surfaces; length 3 to 5.5 in.; breadth 1.25 to 2.25 in.; petioles .4 to .8 in. long, winged near the apex. *Stipules* broadly ovate, subacute, .1 in. long. *Cyme* on a peduncle about 1 in. long (longer in fruit), corymbosely branched, the bracts at the forks linear-lanceolate. *Flowers* in cymules of three, everywhere canescent, on short pedicels bibracteolate at the base. *Calyx* campanulate with elongated tube; the mouth with 5 erect ovate-triangular lobes. *Corolla* longer than the calyx; the tube short, slightly villous at the base near the insertion of the broad sub-sessile anthers; the 5 lobes broadly ovate, acute. *Fruit* ovoid-ellipsoid, 12-ridged, crowned by the small calyx, .3 to .4 in. long. *Seeds* many-ridged on both dorsal and ventral surfaces.

SINGAPORE: *Ridley* 48, 10818. JOHORE: *Ridley* 6472. MALACCA: on Mt. Ophir, *Hullett* 811; *Goodenough* 1363.

11. *PSYCHOTRIA POLYCARPA*, Hook. fil. Fl. Br. Ind. III. 165. A climber, glabrous except the inflorescence; young branches thinner than a goose-quill, terete, when dry dark-coloured. *Leaves* coriaceous, ovate- or obovate-lanceolate to obovate- or ovate-rotund, the apex in the narrower forms shortly and bluntly acuminate, in the broader abruptly and bluntly apiculate; both surfaces olivaceous when dry, the upper somewhat shining, the lower dull and darker, the midrib prominent on both; main-nerves 5 or 6 pairs, spreading, faint on both surfaces; length 2 to 3 in.; breadth .75 to 1.75 in.; petioles .3 to .6 in. *Stipules* very short, connate to form a collar, caducous. *Panicles* large, umbellately cymose, longer than the leaves (sometimes very much so); their branches numerous, spreading, puberulous, with minute bracteoles at the divisions. *Flowers* .15 in. long, numerous, in ultimate cymules of 2 or 3, shortly pedicellate. *Calyx* thick, minutely pubescent, shortly campanulate or sub-cupular, the mouth with 5 acute teeth or subentire. *Corolla* longer than the calyx, salver-shaped, its 5 lobes spreading, lanceolate, acute, the throat sericeous; anthers 5, elliptic. *Fruit* ellipsoid, tapered to the base, and the apex crowned by the rather large remains of the calyx; obscurely ridged; .15 in. long and .1 in. in diam.; sometimes sub-globular, the epicarp somewhat pulpy. *Seeds* slightly convex and faintly ridged on the dorsal surface, the ventral with a broad

shallow groove. *P. obovata*, Wall. Cat. 8380A. *Grumilea polycarpa*, Miq. Fl. Ind. Bat. II. 295.

SINGAPORE: *Ridley* 2029. MALACCA: *Griffith* (K.D.) 3042; *Main-gay* (K.D.) 924; *Hullett* 402. JOHORE: *Ridley* 4090, 11160. PENANG: *Curtis* 1095. PERAK: *Wray* and *King's Collector* many numbers. DISTRIB.—Java, *King*; *Forbes* 1061; *Koorders* 28043B.

12. *PSYCHOTRIA CALOCARPA*, Kurz in Journ. As. Soc. Beng., 1872, II. 315. A glabrous shrub 2 to 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry. Leaves thickly membranous, oblong-oblancheolate or oblanceolate, shortly caudate-acuminate at the apex, much attenuate at the base, the edges sometimes broadly crenate; both surfaces olivaceous when dry, the midrib and nerves broad, distinct and pale; main-nerves 10 to 12 pairs, slightly curved, spreading and interarching to form a bold pale intramarginal nerve .1 to .15 in. from the edge; length 5 to 8 in.; breadth 1.65 to 2.5 in.; petiole .75 to 1.25 in., slightly winged near the apex. Stipules broadly triangular, acuminate, membranous, sometimes bifid, .2 in. long. Cymes terminal or axillary, sessile or shortly pedunculate, shorter than the petioles, about 1.25 in. across and .5 in. long, branched from near the base, the branches compressed, trichotomous; the bracteoles lanceolate, acuminate. Flowers .2 in. long, on short pedicels. Calyx with a short cylindric tube and 4 longer oblong blunt sub-erect concave lobes. Corolla exceeding the calyx, narrowly campanulate, bluntly 4-lobed, the throat densely sericeous, otherwise glabrous. Fruit sub-globose or ovoid, sub-compressed; the epicarp fleshy, glabrous, rugulose when dry; .3 in. in breadth and rather less in length, the persistent calyx-lobes small. Seeds large, the dorsal surface faintly 1-ridged, the ventral deeply grooved. Kurz For. Fl. Burm. II. 9; Hook. fil. Fl. Br. Ind. III. 173. *P. asiatica*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 160; Wall. Cat. 8331: not of Linn. nor of Roxb. *P. viridiflora*, Reinw. var. *undulata*, Kurz For. Fl. Burm. II. 13. *P. picta*, Wall. Cat. 8353; and *Psychotria*, l.c. 8359.

PERAK: *Ridley* 7199; *Wray* 2200; *King's Collector* 1930, 2348, 6798, 10772; *Scortechini*. MALACCA: *Hervey*.—DISTRIB. Himalaya, Assam, Burma.

This plant is very common in the lower Himalaya, Assam, and Burma. In the Flora of British India it is described as herbaceous, but the Malayan specimens are all woody. The leaves are always readily distinguished, when dry, by the pale broad main-nerves and by the very conspicuous intra-marginal nerve. In Malaya the plant is glabrous, but in the Indian specimens the under surfaces of the leaves are decidedly puberulous.

13. *PSYCHOTRIA MULTICAPITATA*, n. sp. King & Gamble. An erect



much-branched shrub 3 to 7 feet high; young branches thinner than a goose-quill, slightly compressed, swollen at the nodes, pale, deciduously puberulous. *Leaves* thinly membranous, greenish when dry, broadly obovate-lanceolate, oblong or elliptic, abruptly and shortly caudate-acuminate, the base narrowed to the rather short petiole; upper surface quite glabrous; the lower scurfy-puberulous on the broad midrib and 9 to 13 pairs of curved spreading main-nerves; length 5 to 10 in.; breadth 2.5 to 4 in.; petiole .75 to 1.15 in. *Stipules* free, broadly triangular, .15 in. long. *Cymes* terminal, solitary, peduncled, about 2 in. long (including the peduncle) and the same in breadth, umbellately branched from near the base; the ultimate branches numerous, bearing terminal many-flowered globular minutely bracteolate cymes, about .5 in. in diam., the common peduncle about an inch or more long, the branches shorter, all puberulous. *Flowers* on short puberulous pedicels, ovoid in bud, about .15 in. long when expanded. *Calyx* cupular, with 5 or 6 triangular acute sub-erect teeth. *Corolla* longer than the calyx, the tube cylindric and, like the throat, densely white-sericeous inside; lobes of the limb short, triangular, deflexed. *Anthers* bifid at the base. *Style* thick, bifid, longer than the corolla. *Fruit* ellipsoid-obovoid, 10-ridged, crowned by the small calyx, glabrous, .3 in. long. *Seed* dorsally with 4 faint ridges, ventrally somewhat concave.

PERAK: *Scortechini* 214, 291; *King's Collector* 436, 867, 2862, 5402, 7380, 7513, 10559.

14. *PSCHYOTRIA TORTILIS*, Blume Bijdr. 953. Stem woody below, erect, 6 to 18 in. high, not branched, cinereous, 4-angled, sparsely covered with short coarse scurfy hairs. *Leaves* membranous, broadly elliptic or ovate-elliptic, the apex acute or sub-acute, narrowed from below the middle to the petiole; upper surface when dry dark green, the lower pale, glaucous, minutely lepidote; the 8 to 11 pairs of slightly curved spreading main-nerves covered with minute short coarse deciduous dark-coloured hairs; length 4 to 6 in.; breadth 1.75 to 3 in.; petioles .5 to 2 in., compressed, scurfy-pubescent. *Stipules* broadly triangular, much acuminate, bifid, .15 to .3 in. long. *Cymes* solitary, sessile, axillary, dichotomous, many-flowered, condensed, .5 in. to 1 in. long and as much broad. *Flowers* .15 in. long, on short ebracteolate pedicels. *Calyx* campanulate, with 5 triangular spreading teeth, covered with coarse hair. *Corolla* longer than the calyx, narrowly campanulate, with 5 ovate acute lobes, hairy like the calyx. *Anthers* 5, sessile, oblong, blunt, included. *Style* shorter than the calyx; stigmas short, linear, divergent. *Fruit* crowned by the small calyx-lobes, reniform, pale with numerous short vertical brown streaks, and stiff short white hairs, .1 in. broad and less in length; the dorsal surface of each of the two

cartilaginous cocci with 3 bold ridges. *Seeds* bluntly 5-ridged on the dorsal, broadly grooved on the ventral surface. DC. Prod. IV. 520; Hook. fil. Fl. Br. Ind. III. 169. *P. microcarpa*, Wall. Cat. 8344. *Streblosa tortilis*, Korth. Kruidk. Arch. II. 246.

PENANG: *Wallich* 8344; *Curtis* 405, 1269. SINGAPORE: *Lobb*. PERAK: *King's Collector* 710, 2627; *Scortechini*.—DISTRIB. Sumatra, *Forbes* 1495.

15. *PSYCHOTRIA GRIFFITHII*, Hook. fil. Fl. Br. Ind. III. 171. A shrub; glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, terete, of a dark colour when dry. *Leaves* coriaceous, oblong or elliptic, shortly and somewhat abruptly acuminate, the base cuneate, the edges slightly recurved and pale, both surfaces drying olivaceous-green, shining, the midrib and the 12 to 15 pairs of curved spreading main-nerves distinct; length 6 to 10 in.; breadth 1·75 to 3·5 in.; petiole ·4 to ·8 in., slightly winged above, stout. *Stipules* broadly triangular, sub-acute, ·2 to ·3 in. long. *Cymes* terminal, solitary, pyramidal, about 1·5 in. long and the same in breadth, on naked compressed peduncles 1·5 in. or more long (lengthening to 2 in. or more in fruit); branches short, stout, puberulous, ebracteolate; the ultimate ones bearing the shortly pedicelled flowers in cymes of three. *Flowers* ·2 in. long. *Calyx* campanulate, with 5 broadly triangular acute sub-erect teeth. *Corolla* as long as the calyx, fleshy, tubular, with 5 broad oblong hooded lobes; the tube finely sericeous inside, otherwise glabrous. *Anthers* 5, broadly oblong, entire, dorsifixed; the filaments thin, compressed, broad. *Style* short, with 2 broad flat lobes. *Fruit* elliptic, slightly obovoid, the apex sub-truncate, crowned by the remains of the disk and calyx, glabrous, black when dry, ·4 in. long and ·35 in. broad; with 4 broad vertical ridges, two of them grooved externally and consisting of two ridges united, the other two single; 2-celled, and 2-seeded. *Seeds* large, the dorsal surface with a single ridge, the ventral flat, not grooved, everywhere smooth.

MALACCA: *Griffith* (K.D.) 3044; *Maingay* (K.D.) 918; *Hervey*; *Derry* 367. PERAK: *Ridley* 2873. SINGAPORE: *Ridley* 2872, 2873, 6314, 6468, 6556; *Hullett* 848.

16. *PSYCHOTRIA ANGULATA*, Korth. in Ned. Kruidk. Arch. II. 243. A shrub 4 to 6 ft. high, glabrous except the inflorescence; young branches pale brown when dry, thinner than a goose-quill, terete. *Leaves* coriaceous, oblanceolate to oblanceolate-elliptic, the apex shortly and rather abruptly acuminate, the base much narrowed; both surfaces brown when dry, tinged with olivaceous; the upper very shining, the broad midrib and nerves depressed; the lower less shining, the midrib

very prominent, and the 8 to 10 pairs of spreading nerves thin but distinct; length 4 to 6 in.; breadth 1 to 1·75 in.; petiole ·2 to ·5 in., slightly winged near the apex. *Stipules* broadly triangular, acute, sub-acute or bifid, ·25 in. long. *Cyme* solitary, terminal, pyramidal, about 1·5 in. long, on a naked peduncle 1·25 to 3 in. long; branches whorled, shortly bracteolate at their bases, spreading; the ultimate branchlets crowded at their ends with numerous sessile flowers ·25 in. long. *Calyx* pale, widely cupular, ·05 in. long, with irregular small teeth. *Corolla* thick, tubular, its 5 broad lobes with acute inflexed apices; the throat densely sericeous. *Anthers* elliptic, blunt, on short filaments. *Fruit* ovoid or narrowly obovoid, pulpy, obscurely ridged, glabrous, crowned by the small calyx, ·5 in. long and half as much broad (unripe), 2-celled. *Seeds* 2, plano-convex. Miq. in Ann. Mus. Lugd. Bat. IV. 210; Hook. fil. Fl. Br. Ind. III. 172. *Psychotria*, Wall. Cat. 8348. *Chasalia perforata*, Miq. Fl. Ind. Bat. Suppl. 546.

MALACCA: Griffith (K.D.) 3037. PROVINCE WELLESLEY: Ridley 7026. JOHORE: Ridley 11161. SINGAPORE: Ridley 2867. PAHANG: Ridley 1353. PENANG: Curtis 14, 726; King's Collector 1683. PERAK: King's Collector 4170.—DISTRIB. Burma.

17. *PSYCHOTRIA HELFERIANA*, Kurz in Journ. As. Soc. Beng., 1872, II. 314. A shrub; the whole plant more or less rusty-pubescent; young branches as thick as a goose-quill or thicker, the pubescence dense and deciduous. *Leaves* thickly membranous, elliptic or oblong-elliptic, rarely obovate-elliptic, the apex acuminate, the base usually cuneate but sometimes rounded; both surfaces dark brown when dry, the lower somewhat tinged with red and less hairy than the upper; the hairs on both adpressed and very numerous on the stout midrib, less so on the 9 to 16 pairs of spreading curved main-nerves; length 6 to 12 in.; breadth 2·5 to 4·5 in.; petioles 1 to 1·75 in. *Stipules* broadly ovate to oblong-lanceolate, often as much as 1 in. long, the apex acuminate bifid. *Flowers* ·2 in. long, numerous, mixed with many unequal bracteoles mostly longer than themselves, all acuminate and some of them bifid and crowded in dense pedunculate capitula in a few-branched axillary cyme usually shorter than the leaf-petioles. *Calyx*-tube narrowly campanulate, with 5 lanceolate erect lobes nearly as long as itself, everywhere pilose. *Corolla* similar to the calyx, but smaller and less hairy. *Stamens* almost sessile; anthers broad, blunt. *Fruit* ovoid or ellipsoid, somewhat compressed and boldly 8-ridged, crowned by the lobes of the calyx, ·3 in. long and ·2 in. in diam. Kurz For. Fl. Burm. II. 11; Hook. fil. Fl. Br. Ind. III. 172.

SINGAPORE: Wallich 8368; Goodenough 184; Maingay (K.D.) 921. MALACCA: Maingay (K.D.) 921; Ridley 184; Lobb. JOHORE: Ridley

11159; *King*; *Hullett* 507. PERAK: *King's Collector* 4345, 4661.  
—DISTRIB. Burma.

VAR. *diffusa*, *King* & *Gamble*. Capitula in spreading pedunculate panicles several inches in diam.

PERAK: *Scortechini* 400. JOHORE: *Ridley* 3732. SINGAPORE: *Hullett*.

VAR. *angustifolia*, *King* & *Gamble*. Leaves elliptic-oblong or oblong, not more than 2 in. in width; capitulum solitary, sessile.

SINGAPORE: *King*.—DISTRIB. Andamans.

VAR. *glabra*, *King* & *Gamble*. Leaves glabrous.

PERAK: *Wray* 1963.

18. PSYCHOTRIA MONTANA, *Blume Bijdr.* 960. A stout glabrous shrub; young branches half as thick as a goose-quill, angled, brown when dry. Leaves thinly membranous, on rather long petioles, elliptic or elliptic-oblong, acuminate, the base cuneate; both surfaces greenish or olivaceous-brown when dry, the lower the paler; main-nerves 7 to 8 pairs (rarely 10 pairs) curving upwards, pale and bold like the midrib on the lower surface, faint on the upper; length 5 to 8 in.; breadth 1·75 to 3·5 in.; petioles ·4 to 1·25 in., winged near the apex. Stipules connate by their short broad bases, the apices caudate-acuminate, curved. Cymes terminal, paniculate, on angled peduncles ·5 to 1·25 in. in length; branches spreading, angled, bearing numerous shortly pedicelled flowers in cymes of three. Flowers ·25 in. long. Calyx cupular with 5 broad spreading triangular teeth. Corolla with subcampanulate tube having a broad band of hairs inside in the upper half; the lobes of the mouth 5, broad, acute, reflexed. Fruit ellipsoid-ovoid to ellipsoid, boldly 4-ridged, glabrous, ·25 to ·3 in. long. Seeds: the dorsal surface with a single ridge, the ventral deeply concave, grooved. DC. Prod. IV. 521; Hook. fl. Fl. Br. Ind. III. 174. *P. viridissima*, *Kurz* in Journ. As. Soc. Beng. 1872, II. 315; For. Fl. Burm. II. 13. *Chasalia montana*, *Miq.* Fl. Ind. Bat. II. 281. *C. expansa*, var. *montana*, *Miq.* MS. *Psychotria*, *Wall.* Cat. 8371, 8378, and Rubiaceæ, 8339. *Coffea tabaccifolia*, *Wall.* Cat. 8334.

PERAK: *Scortechini*; *Ridley*, 2922; *King's Collector*, 452, 2190; *Wray* 276.—DISTRIB. Sumatra, *Forbes* 1566, 1862, 2201, 2241, 2330. JAVA: *Blume*; *Forbes* 271, 759, &c. Burma; Assam; Sylhet (*Griffith*, K.D.) 3047.

VAR. *brevipetiolata*, *King* & *Gamble*. Leaves with petioles ·2 to ·4 in. long.

PERAK: *Scortechini* 277, 1513; *Wray* 1628, 2289; *King's Collector* 389, 922, 1954, 2190, 4707, 6111, 8596. SELANGOR: *Ridley* 10583. PAHANG: *Ridley* 5831. MALACCA: on Mt. Ophir, *Hullett* 762

19. *PSYCHOTRIA VIRIDIFLORA*, Reinw. ex Blume Bijdr. 965. A small tree or a bush, all parts, except the inflorescence, glabrous; young branches thinner than a goose-quill, dark brown. *Leaves* membranous, oblong-elliptic to oblanceolate-elliptic, shortly and stoutly acuminate, the base much narrowed; both surfaces brown when dry; main-nerves 8 to 14 pairs, curved, spreading, rather faint on both surfaces; length 3·5 to 8 in.; breadth 1·25 to 2·5 in.; petiole ·4 to ·75 in. occasionally as much as 1·25 in. long. *Stipules* broadly oblong, narrowed to the apex, but not acute, ·3 to ·5 in. long, deciduous. *Cymes* on naked peduncles (·3 to 1·5 in. long) in broad panicles 1 to 2 in. long and as much wide (more when in fruit); branches divaricating, puberulous, with small broad bracteoles. *Flowers* in small cymes, on the ultimate branches, ·1 in. long, on short pedicels, glabrous outside. *Calyx* cupular with irregular, short, sharp teeth. *Corolla* longer than the calyx, widely tubular, with 5 broad sub-acute lobes; the throat sericeous. *Anthers* 5, oblong, blunt, attached by short filaments in the throat. *Fruit* elliptic, with a wide shallow areola on the apex, the sides with 10 bold vertical ridges (2 of them double), glabrous, about ·25 in. long and ·2 in. in diam. *Seeds* plano-convex, the convexity deeply 5-grooved, the ventral surface flat. *P. sulcata*, Wall. Cat. 8370; Hook. fil. Fl. Br. Ind. III. 168. *P. Jackii*, Hook. fil. Fl. Br. Ind. III. 167.

MALACCA: *Griffith* (K.D.) 3021; *Goodenough* 1878; *Derry* 457, 1224; *Ridley* 1600. PANGKORE: *Curtis* 1369. TRANG: *Wray* 2778. NEGRI SEMBILAN: *Ridley* 1930. SELANGOR: *Ridley* 7434. PERAK: *Scortechini*; *Ridley* 2919, 3067; *Wray* 290, 2027, 2778, 2956; *King's Collector* 2655, 4275, 4374, 5964, 6327, 7224. PENANG: *Wallich* 8343, 8370.—DISTRIB. Burma, *Helper & Griffith* (K.D.) 3040; Sumatra, *Forbes*; Java, *Blume*; Borneo, *Beccari*; *Motley*; *Haviland*.

20. *PSYCHOTRIA BIRCHIANA*, n. sp., King & Gamble. Herbaceous; woody at the base; all parts softly rusty-pubescent; stems 6 to 18 in. high, thinner than a goose-quill, their pubescence crisped, dense, coarse, and entirely or partly deciduous. *Leaves* thickly membranous, elliptic to elliptic-oblong, sometimes sub-obovate, acute, the base rounded or minutely cordate or sometimes cuneate; both surfaces brown when dry, the lower sometimes paler and with fewer hairs; the midrib prominent and very hairy on both sides, the 10 to 12 pairs of rather faint little-curved spreading main-nerves less hairy than the midrib; length 3·5 to 5 in.; breadth 1·5 to 2·25 in.; petiole ·5 to 1 in., covered with coarse tomentum mixed with ovate-acuminate scales. *Stipules* oblong-ovate, acuminate, ·5 to ·75 in. long. *Cymes* pedunculate, solitary, terminal, spreading, 1·5 to 2 in. across, and about as long, the branches spreading, bracteate at the divisions, the bracts lanceolate,

acute, reflexed, .2 or .3 in. long; the peduncle 1.5 to 2.5 in. long, scaly, tomentose; ultimate branches short, bearing at their apices dense capitules of small sub-sessile flowers, mixed with short broad bracteoles. *Flowers* about .1 in. long. *Calyx* cupular-campanulate, pubescent; the mouth wide and with 5 blunt, triangular, spreading lobes. *Corolla* exceeding the calyx, widely tubular, with 5 or 6 short inflexed teeth, glabrous inside, hairy outside. *Anthers* oblong, blunt at each end, the filaments short. *Fruit* ellipsoid, tapering equally to each end, boldly 10-ridged, somewhat compressed, crowned by the hairy calyx-lobes, otherwise sub-glabrous, .25 to .3 in. long and .2 in. across. *Seeds* with 5 dorsal ridges, the ventral surface plane.

PERAK, on Birch's Hill, elev. 4,000 feet: *Scortechini* 258; *Wray* 1; *King's Collector* 2134, 2950, 7348. SELANGOR: *Ridley* 7432.

The flowers are described as white, and the ripe fruit as cherry red. Named in honour of Mr. Birch, a British civil officer, who was murdered by the aborigines in Perak.

21. *PSYCHOTRIA FULVA*, Buch.-Ham. ex. Wall. Cat. 8366, excl. B. A shrub; young branches thinner than a goose-quill, dark brown when dry, bearing a few scattered coarse hairs. *Leaves* thickly membranous, elliptic, shortly acuminate and tapering almost equally to the base; upper surface without hairs except a few on the midrib near the base, under surface with dark cinereous pubescence on the midrib and 15 to 18 pairs of sub-horizontal slightly curved main-nerves; length 5 to 7 in., breadth 1.75 to 3.5 in.; petioles 1.25 to 2.4 in., coarsely and deciduously pubescent. *Stipules* membranous, broadly oblong, the apex deeply and acuminate bifid, the edges coarsely ciliate; length about 1 in. *Cymes* pedunculate, axillary, trichotomous, the flowers in condensed capitular cymes at the ends of the short branches, enveloped when in bud in 2 or 3 large deciduous bracts; in fruit about 2 in. across and less in length; peduncles about 2 in. long; branches about .5 in. long, horizontal; all, like the short flower pedicels, coarsely rusty-pubescent. *Calyx* cupular, with 5 deep, spreading, narrow, acuminate lobes. *Corolla* not seen. *Fruit* narrowly elliptic, somewhat compressed, tapering slightly to each end, the apex crowned by the erect connivent calyx-lobes, boldly but somewhat unequally 12-ridged, glabrous, .45 in. long and .25 in. in diam. *Seeds* 5-ridged on the dorsal, the ventral surface flat. Hook. fil. Fl. Br. Ind. III. 169, excl. syn. *P. monticola*, Kurz. *Psychotria*, Wall. Cat. 8337; Griff. Notulæ, IV. 268; Ic. Pl. Asiatic. t. 479, f. 2.

PERAK, On Ulu Batung Padang: *Wray* 1615.—DISTRIB. E. Bengal, *Griffith* (K.D.) 3022, 3034, 3035, 3036; Khasia, *Hook f. & Thoms.* 14.

*P. monticola*, Kurz, a Burmese plant, has been reduced to *P. fulva*, Buch.-Ham., but in my opinion it is quite distinct.

22. *PSYCHOTRIA FULVOIDEA*, n. sp., King & Gamble. A small shrub; young branches thinner than a goose-quill, dark-coloured, glabrous. *Leaves* membranous, narrowly elliptic, acuminate, crenulate, the base cuneate; upper surface glabrous, dark brown when dry, the lower reddish-brown; the midrib, nerves and reticulations rusty-pubescent, otherwise glabrous; midrib prominent on both surfaces, the 10 to 14 pairs of spreading, curving main-nerves slightly prominent on the lower; length 6 to 7 in.; breadth 2 to 2.5 in.; petiole 1 to 1.3 in. *Stipules* membranous, ovate, caudate-acuminate, the edges irregularly serrate, ciliate, length about 1 in. *Cymes* axillary, trichotomous, condensed, about 2 in. broad when in fruit and 1.25 in. long, on deflexed, coarsely but shortly pubescent peduncles 3 in. long; their branches short, spreading, bracteate at the divisions and coarsely pubescent. *Flowers* condensed into globose capitulate cymes at the apices of the branches, sessile. *Calyx* narrowly campanulate, pubescent, with 5 erect acute teeth. *Corolla* unknown. *Fruit* narrowly elliptic, tapering to each end, the apex crowned by the short pubescent lobes, with 12 deep ridges and grooves, glabrous, .4 in. long and .2 in. in diam. *Seed* dorsally 5-ridged, ventrally 2-grooved.

PERAK: *Scortechini* 538.

This approaches *P. fulva*, but is a smaller plant, with crenulate leaves quite glabrous on the upper surface and nearly so on the lower.

23. *PSYCHOTRIA STIPULACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 164. A shrub, 1 to 2 feet high, all parts except the inflorescence glabrous; stems as thick as a goose-quill, brown when dry. *Leaves* membranous, broadly oblanceolate to elliptic, or oblong, abruptly and shortly acuminate, much narrowed to the base; both surfaces glabrous, when dry brown with a reddish tinge; midrib very stout, main-nerves 11 to 13 pairs, spreading, slightly curved, distinct on both surfaces; length 5 to 9 in.; breadth 2 to 4 in.; petioles .5 to 1.25 in. long, winged near the apex. *Stipules* large, sub-persistent, ovate, sometimes bifid, .75 to 1 in. long, and about .4 in. broad. *Cyme* usually solitary, corymbose, trichotomous, terminal, on a short peduncle, bracteate at the base, about 2 to 3 in. in diam.; its branches puberulous, bracts and bracteoles triangular. *Flowers* .15 in. long, on short pedicels, clustered in dense, cymose, capituliform cymes at the ends of the ultimate branches. *Calyx* campanulate, with 5 broad pubescent lobes, the tube glabrous. *Corolla* longer than the calyx, widely campanulate, 4- or 5-toothed. *Fruit* ellipsoid, sub-compressed, 10-ridged, crowned by the small calyx, .3 in. long, and .15 in. in diam. *Seed* dorsally 5-ridged, ventrally concave, with one central ridge. Wall. Cat. 8329; DC. Prod. IV. 519; Hook. fil. Fl. Br. Ind. III. 167.

PENANG: Wallich 8329; Curtis 732. TRANG: Kunstler 1382. PAHANG: Ridley 2216. PERAK: Ridley 2918; King's Collector, 1357, 1382; Wray 3440; Scortechini 278, 307, 558, 692.—DISTRIB. Sumatra.

24. *PSYCHOTRIA CURTISII*, n. sp., King & Gamble. A shrub, 6 feet high; young branches thinner than a goose-quill, rusty-pubescent. *Leaves* elliptic, sometimes somewhat obovate, tapering equally to each end, shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper glabrous or with a few hairs on the midrib near the base, the lower rusty-puberulous between the 9 or 10 pairs of bold, shortly and densely rusty-pubescent curved ascending main-nerves; length 5 to 8 in.; breadth 1.5 to 3 in.; petioles .5 in., densely rusty-pubescent. *Stipules* caducous. *Cyme* solitary, terminal, 3-branched, on a pubescent peduncle from .3 to .5 in. long (much longer in fruit), branches bearing 3 to 5 sessile flowers in capitula at their apices; bracteoles linear. *Flowers* .25 in. long, rusty-pubescent. *Calyx* half-superior, campanulate, the mouth with 5 long, spreading, ovate-acuminate lobes. *Corolla* longer than the calyx, salver-shaped, with 5 oblong lobes. *Fruit* ovoid, tapering to the apex, crowned by the long lobes of the calyx, the sides puberulous, 10-ridged. *Seeds* with 4 ridges on the dorsal surface, the ventral plane.

PENANG: Curtis 2695.

25. *PSYCHOTRIA RHINOCEROTIS*, Reinw. ex Blume Bijdr. 961. A shrub; young branches thinner than a goose-quill, at first rusty-tomentose, afterwards glabrescent and pale brown. *Leaves* coriaceous, obovate-oblong or obovate-oblongate, the apex broad, but usually with a small abrupt apiculus, the base cuneate; upper surface olivaceous, glabrous, the lower brown and softly and finely rusty-pubescent; the midrib broad, more prominent on the upper than on the lower surface; main-nerves 10 to 14 pairs, slightly curved, oblique, distinct on both surfaces; length 3 to 5 in.; breadth 1.35 to 2.5 in.; petiole .2 to .6 in., stout. *Panicle* solitary, terminal, 1.5 in. long and slightly wider; branches few, lax, divaricate, cymosely few-flowered. *Fruit* elliptic-ovoid, slightly compressed, with 10 vertical grooves (2 of them double), crowned by the rather broad, bluntly 5-toothed calyx, acutely 10-ridged (2 ridges double), pubescent between the ridges; length .25 in.; breadth .2 in. *Seeds* dorsally 4-ridged, ventral surface plane. Miq. Fl. Ind. Bat. III. 292; DC. Prod. IV. 521; Korth. Kruidk. p. 242.

PERAK: King's Collector 8272; Scortechini.

26. *PSYCHOTRIA MALAYANA*, Jack in Mal. Misc. I. 3; reprinted in Calc. Journ. Nat. Hist. IV. (1843), p. 26. A shrub; young branches



rather thinner than a goose-quill, sub-terete, glabrous, rather pale brown when dry. *Leaves* coriaceous, elliptic or broadly elliptic-lanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surfaces glabrous, brown, shining when dry, the lower dull and sparsely pubescent, often tinged reddish, the edges slightly recurved; main-nerves 12 to 18 pairs, ascending, little curved, bold on the lower surface and faint on the upper; length 5 to 10 in.; breadth 2·5 to 4·5 in.; petioles ·4 to 1·5 in. *Stipules* broadly ovate, blunt, about ·35 in. long. *Cyme* terminal, on an angled, sub-compressed peduncle ·5 to 1 in. long (lengthening in fruit), the branches corymbose, whorled, many-flowered; ultimate cymules 3-flowered. *Flowers* ·5 in. long, 2 on each cymule, on short pedicels (the middle one sessile), minutely bracteolate at the base. *Calyx* under ·1 in. long, tubular, the truncate mouth minutely 5-toothed. *Corolla* tubular, ·4 in. long, with 5 oblong sub-acute lobes; the throat villous inside. *Fruit* ·4 in. long and ·3 in. in diam., elliptic-ovoid, vertically 10-ridged, the apex with very slight remains of the calyx. *Seeds* faintly 4-ridged on the dorsal, the ventral surface plane with a faint central groove. DC. Prod. IV. 520. *P. aurantiaca*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall., II. 165; Blume Bijdr. 962; Wall. Cat. 8335. *Grumelia aurantiaca* and *Chasalia expansa*, Miq. Fl. Ind. Bat. II. 296 and 281.

SINGAPORE: *Ridley* 6468, 8422; *Hullett* 904. PAHANG: *Ridley* 2197. PERAK: *King's Collector* 6327, 7168; *Wray* 2956; *Scortechini* 307.—DISTRIB. Borneo, Java.

The corolla of this is larger than that of any other Malayan species of *Psychotria*, being about ·4 in. long when dry.

#### SPECIES IMPERFECTLY KNOWN.

27. *PSYCHOTRIA WRAYI*, n. sp., King & Gamble. A small shrub, glabrous except the inflorescence; young branches as thick as a swan's-quill, terete, dark-coloured when dry. *Leaves* coriaceous, oblanceolate-elliptic, shortly acuminate, gradually narrowed from about the middle to the short, partially winged petiole; both surfaces dark olivaceous-brown when dry, the midrib rather prominent; main-nerves 13 to 15 pairs, oblique, almost straight, thin but pale and rather distinct on the lower surface, indistinct on the upper; length 6 or 7 in.; breadth 2 to 2·5 in.; petiole about ·5 in., winged above. *Stipules* broadly ovate, sub-acute, the edges coarsely ciliate, ·5 in. long. *Cymes* terminal, on short peduncles, bracteate at the base, umbelliform, widely spreading, about 4 in. broad and only half as long; the branches 4-angled, sub-compressed, pubescent, divergent. *Flowers* crowded at the extremities of the branchlets, ·25 in. long, on short thick pedicels. *Calyx* deeply

cupular, with 5 broad, shallow blunt teeth. *Corolla* much longer than the calyx, widely tubular; lobes 5, blunt, broadly ovate, reflexed, the throat with a little short hair. *Anthers* 5, narrowly elliptic, blunt, on short filaments, almost basifixed, exerted by the reflexion of the lobes of the corolla. *Fruit* unknown.

PERAK: *Wray* 3959; *King's Collector* 2755.

28. *PSYCHOTRIA INÆQUALIS*, n. sp., King & Gamble. A small unbranched shrub; the stem thinner than a goose-quill, deciduously puberulous, only a foot high, brown when dry. *Leaves* thickly membranous, those of a pair somewhat unequal in size, elongate-obovate, the smaller one oblong-elliptic, all abruptly and shortly acuminate, the base cuneate; upper surface glabrous, minutely pitted when dry; the lower with many coarse pale-brown, crisped, flattened hairs on the midrib and nerves, and a few pale appressed hairs on the interspaces; midrib broad and channelled on both surfaces, as are also the 10 to 13 pairs of pale ascending, slightly curved main-nerves; length 6 to 10 in.; breadth 2·5 to 5 in.; petiole ·5 to ·75 in., stout. *Stipules* narrowly ovate, acuminate, pubescent, ·65 in. long. *Cyme* solitary, terminal, 2 to 3·5 in. long (including the 1 to 2 in. peduncle), pyramidal, everywhere rusty-puberulous, the branches opposite, many-flowered, and with broad abruptly acuminate bracts; the lowest pair exceeding 1 in. in length, reflexed; branchlets divaricate. *Flowers* ·1 in. long, on short stout pedicels. *Calyx* small, tubular; its lobes broadly triangular. *Corolla* not much longer than the calyx, its lobes linear with moniliform bluish hairs at their bases and on the throat. *Fruit* unknown.

PERAK: *Scortechini* 279.

29. *PSYCHOTRIA CONDENSEA*, n. sp., King & Gamble. A small woody shrub; young branches half as thick as a goose-quill, the nodes close together and slightly thickened, the internodes striate, at first scurfy-puberulous but afterwards glabrous. *Leaves* coriaceous, narrowly elliptic or elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface when dry very dark brown, the lower paler and tinged with olivaceous, the midrib prominent and pale; the 5 or 6 pairs of oblique main-nerves visible beneath but not above; length 1 to 1·25 in.; breadth ·3 to ·5 in.; petiole ·05 in. *Stipules* broadly triangular, acuminate, nearly ·1 in. long. *Umbel* cymose, 3-branched, terminal, shorter than the leaves; each branch with 3 unequally pedicillate flowers. *Flowers* not seen. *Fruit* globular-ovoid, with 2 prominent furrowed vertical ridges and several obscure ones between them, crowned by the 5-toothed calyx; length ·2 in.; breadth ·15 in. *Seeds* with one prominent dorsal ridge, ventral surface flat.

PERAK: *Scortechini*.

## Order LX. VALERIANEÆ.

Herbaceous (as regards the Indo-Malayan species). *Leaves* opposite, exstipulate, their bases often connected by an interpetiolar line or ridge; entire, pinnatifid or pinnate. *Flowers* sessile, in cymes, usually hermaphrodite but sometimes polygamous or diœcious, bracteate. *Calyx-tube* adnate to the ovary, the limb in the flower small, in the fruit often enlarged or pappose. *Corolla* superior, gamopetalous, its tube cylindric or gibbous or spurred at the base; the limb with 3 to 5 imbricate lobes, often irregular. *Stamens* 1 to 4, on the tube, usually exserted. *Ovary* inferior with a single perfect, 1-ovuled cell, and 2 barren empty cells; style filiform; stigma 2- or 3-lobed or entire; ovule in the fertile cell pendulous from the apex of the loculus. *Fruit* indehiscent, dry, 1-seeded, the 2 barren cells enlarged or represented by narrow ridges. *Seed* pendulous, with very little or no albumen; embryo straight, radicle superior.—DISTRIB. About 350 species, in temperate climates; generally diffused, but absent from Australia and South Africa.

## VALERIANA, Linn.

Perennial herbs. *Leaves* entire, pinnatifid or pinnate, the radical often undivided and with long petioles. *Flowers* in cymes, corymbosely paniculate; bracts small, oblong or linear, free or nearly so, persistent. *Calyx-limb* in flower obsolete, in fruit developing into a ring of from 5 to 15 feathery bristles, united at their bases into a short funnel-shaped tube. *Corolla-tube* funnel-shaped, its base often sub-gibbous; limb with 5 spreading lobes, both tube and limb pink or white. *Stamens* 3. *Ovary* 3-celled, only 1 cell containing 1 ovule; stigma sub-entire or shortly 3-fid. *Fruit* oblong, plano-convex, with 6 ribs, 1-celled; the 2 barren cells obsolete, crowned by the persistent pappose calyx.—DISTRIB. About 180 species in moist temperate regions.

VALERIANA HARDWICKII, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. I. 166. *Root* fibrous. *Stem* erect, 1 to 3 feet high, pubescent below, mostly glabrous upwards but pilose or barbate at the nodes. Radical *leaves* ovate, acute, on long petioles; stem *leaves* unequally pinnatifid, the segments 3 to 5, the upper the longest, all lanceolate or ovate-lanceolate and irregularly toothed. *Panicles* lax, often as much as a foot long, the branches dichotomous, with small subulate bracteoles at the forks; fruit hairy. Wall. Cat. 432, Pl. As. Rar. 39, t. 263; Don Prod. Fl. Nep. 159; DC. Prod. IV. 640; Clarke in Hook. fil. Fl. Br. Ind. III. 213. *V. Hardwickiana*, Roem. & Schult., Syst. I., Mant. 259. *V. tenera*, Wall. Cat. 435; DC. Mem. Valer. 16; Prod. IV. 640.

*V. elata*, Don Prodr. 159. *V. javanica*, Blume Bijdr. 919. *V. acuminata*, Royle Ill. Him. Bot. 241.

At high elevations on the central ridge in Perak, this is said to occur, but I have seen no specimens.

### Order LXI. COMPOSITÆ.

Herbs or shrubs, sometimes scandent, rarely trees. *Leaves* alternate, rarely opposite or whorled; simple or sometimes compound exstipulate. *Florets* numerous, small, aggregated in centripetal heads, sessile on the dilated top of the peduncle (receptacle); the heads surrounded by an involucre of 1- or more-seriate, free or connate bracts; bracteoles none or reduced to paleate scales or bristles on the receptacle; individual florets all tubular (head discoid), or the outer or all ligulate (head rayed); all bi-sexual or the inner bi-sexual or male, the outer female or neuter; sometimes dicecious. *Sepals* connate in a calyx-tube, adnate to the ovary; limb none, or composed of hairs (pappus) or scales. *Petals* connate in a corolla of two forms: (a) tubular or campanulate, with 4-5-lobed limb; lobes valvate with marginal nerves; (b) ligulate with lobes elongated and connate in a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4-5, inserted within the corolla-tube; filaments usually free; anthers basifixed, usually connate (syngenesious); connective produced upwards; cells simple or tailed at the base; pollen sub-globose, rough. *Pistil* an inferior 1-celled ovary; ovule solitary, basal, erect, anatropous, nucleus with one coat; style slender, normally 2-fid; the arms (sometimes) connate, linear or sub-terete, naked or pubescent externally or tipped by pubescent cones; the margins stigmatic. *Fruit* a dry indehiscent achene (cypsela). *Seed* erect; testa membranous; albumen none; embryo straight; cotyledons plano-convex; radicle short.—**DISTRIB.** Universal; genera about 1,000; species about 8,000.

Corollas of all the florets either tubular to near the mouth or the marginal row ligulate; style-arms long, distinct, or very short, or the style sub-entire in the sterile florets of heads with heterogamous florets; stems sometimes woody; leaves alternate or opposite; sap never milky:—

Florets red, purple, or white, never yellow; all similar (homogamous) and tubular, or rarely (*Elephantopus*) cleft laterally; involucre of bracts always more than 1-seriate; pappus present, usually setaceous, receptacle naked or rarely (*Ageratum*) paleaceous:—

Anthers cleft at the base and appendiculate at the apex; style-arms subulate, hairy; leaves alternate (*Vernoniæ*):—

Heads distinct, many-flowered; pappus long, copious,  
cypselas ribbed     ..     ..     ..     1. *VERNONIA*.

- Heads 1- or few-flowered, crowded into dense clusters resembling single heads; pappus chaffy .. .. 2. *ELEPHANTOPUS*.
- Anthers sub-entire at the base, either truncate or appendiculate at the apex; leaves opposite at any rate below (*Eupatorieæ*):—
- Anthers truncate at the apex .. .. 3. *ADENOSTEMMA*.
- Anthers appendiculate at the apex:—
- Pappus paleaceous, receptacle sometimes paleaceous .. 4. *AGERATUM*.
- Pappus of slender hairs; receptacle always naked; bracts of involucre 4 with sometimes a small outer one; scandent .. .. 5. *MIKANIA*.
- Florets, if homogamous and tubular, yellow; if heterogamous, at least those of the disk yellow; or if none of the florets yellow (*Emilia*) then with the bracts of the involucre 1-seriate
- Anthers appendiculate at the apex (*Asteroidæ*):—
- Receptacle naked, smooth, or pitted; sometimes, when pitted, the edge of the pit fimbriate:—
- Bracts of involucre in two rows:—
- Anthers sub-entire at the base; florets all tubular, those of the disk purple, of the ray filiform, yellowish or white; pappus none or of 2 bristles; heads small in lax paniced cymes, bracts of involucre in two series; erect herbs .. .. 6. *DICHROCEPHALA*.
- Bracts of the involucre many-seriate, leaves alternate:—
- Anthers obtuse and entire at the base; florets of disk tubular with wide limb; those of the ray filiform-tubular or tubular only at the base, expanding into small yellowish ligules; pappus copious and silky; heads in dense corymbose panicles; climbers .. 7. *MICROGLOSSA*.
- Anthers cleft at the base; style-arms of hermaphrodite flower filiform, linear, or obtuse, or those of the sterile flowers undivided (*Inuloidæ*):—
- Flower-heads medium-sized; separate, solitary, or in corymbose or paniculate cymes, not in globose clusters, if clustered the cypselas with copious soft pappus:—
- Herbs; bracts of involucre narrow; flowers not corymbose:—
- Anther-cells tailed at the base, the tails of adjacent anthers confluent .. .. 8. *BLUMEA*.
- Anther-cells sagittate at the base, not tailed or connate.. .. 9. *LAGGERA*.
- Shrubs; bracts of involucre broad; flowers corymbose .. .. 10. *PLUCHEA*.
- Flower-heads small, clustered in dense ovoid or globose masses; herbs with winged stems; pappus none .. .. 11. *SPHÆRANTHUS*.
- Bracts of the involucre 1-seriate, sub-equal, free or united, with sometimes a few short outer bractlets

(calyculus) at their bases; heads homogamous; anther-cells sub-entire at the base; receptacle naked (*Senecionidæ*):—

Leaves alternate; pappus of fine hairs, style-arms of hermaphrodite flowers truncate or obtuse, penicillate or with a hairy tip:—

Heads ebracteate; florets purple .. .. 12. EMILIA.

Heads bracteolate; florets yellow .. .. 13. GYNURA.

Receptacles paleaceous; anthers sub-entire at the base; bracts of involucre 1- to many-seriate; heads usually radiate, heterogamous; style-arms truncate or appendiculate, or those of the sterile florets entire; pappus of 2 to 4 arms or paleaceous or absent; leaves at the base of the stem usually opposite, those higher up opposite or alternate (*Helianthoidæ*):—

Pappus of only 4 bristly awns, or cup-like or absent:—

Cypselas all thick, or those of the ray-florets 3-angled and those of the disc laterally compressed; pappus cup-like or composed of 2 to 3 stiff chaffy or bristly arms, with or without intermediate smaller scales or altogether absent; leaves usually opposite:—

Inner bracts of the involucre embracing and enclosing the cypselas of the fertile ray-florets; pappus absent, outer bracts of involucre 5, glandular .. .. 14. SIEGESBECKIA.

Inner bracts of the involucre all flat, scales of receptacle flat, very narrow, usually few; disk-florets 4-5-fid, ligules small; pappus absent, or if present shortly 2-awned; outer bracts of involucre numerous .. .. 15. ECLIPTA.

Scales of the receptacle concave or complicated more or less enclosing and embracing the disk florets:—

Cypselas not winged, compressed or 3-5-angled, ray-florets yellow with large ligules; disk-cypselas with 1 or 2 short deciduous awns; leaves all opposite .. .. 16. WEDELIA.

Cypselas of the disk-florets ciliate, winged on the margins, laterally compressed; heads small; leaves always opposite .. .. 17. SPILANTHES.

Cypselas more or less depressed from the top; pappus of 2 (rarely 3 or 4) bristles or absent:—

Outer bracts of the involucre almost equal; herbaceous; inner bracts separate, almost resembling the scales of the receptacle; ray-florets fertile; leaves opposite:—

Cypselas flat, their margins lacerate and winged; pappus composed of bristles .. .. 18. SYNEDRELLA.

Outer bracts of the involucre few, small; inner bracts connate below, membranous:—

- Cypselas not beaked; leaves opposite, simple to pinnatisect .. .. . 19. BIDENS.
- Pappus of membranous scales; heads radiate; leaves opposite:—
- Scales of pappus feathery, fringed; heads medium-sized .. .. . 20. TRIDAX.
- Anthers inappendiculate at the apex; receptacle (in our species) not paleaceous; pappus absent or reduced to a raised rim, rarely scaly and short; leaves usually alternate (*Anthemideæ*):—
- Flower-heads discoid, heterogamous; pappus absent:—
- Florets of the circumference very numerous; cypselas flat or concave at the top; flower-heads globose or hemispheric, sub-sessile; bracts of involucre in 2 series, spreading in fruit .. .. . 21. CENTIPEDA.
- Florets of the circumference few; heads very small, in racemes or panicles; cypselas ellipsoid or obovoid, rounded at the apex .. .. . 22. ARTEMISIA.
- Corollas of all the florets flatly expanded from a tubular base, ligulate, their apices 5-toothed; leaves radical or cauline and alternate, never opposite; stem always herbaceous, fistulose; sap milky (*Cichoriææ*):—
- Pappus of simple hair-like bristles, at least in the central florets; florets yellow, cypselas fusiform or oblong, with glabrous or puberulous ribs .. .. . 23. CREPIS.

NOTE.—The above key is taken mainly from “Bengal Plants,” by Lieut.-Col. D. Prain, F.R.S., Superintendent, Royal Botanic Garden, Calcutta.

# 1. VERNONIA, Schreb.

Herbs, shrubs, climbers or small trees. *Leaves* alternate, pinninerved, entire or dentate. *Heads* axillary or terminal, solitary or in cymes or panicles, homogamous; flowers often few, but very rarely solitary. *Involucre* ovoid, globose or hemispheric, as long as or shorter than the flowers; bracts in many series, the inner longest. *Receptacle* naked or pitted, sometimes with short hairs. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse, sagittate. *Style-arms* subulate, acute, hairy. *Cypselas* striate, ribbed or angled, rarely terete, truncate at the apex; pappus of many hairs, usually in two rows, the inner hairs thin and slender, the outer sometimes stout and compressed, persistent or deciduous.—DISTRIB. About 500 species, mostly American.

A large shrub or small tree; leaves sub-coriaceous; involucre bracts obtuse .. .. . 1. *V. arborea*.

Herbaceous annuals; leaves membranous; involucre bracts acuminate:—

Heads few, .35 in. in diam., in long-peduncled cymes.. .. . 2. *V. chinensis*.

Heads numerous, .2 to .25 in. in diam., in loose terminal corymbose cymes      ..      ..      ..      ..      ..      3. *V. cinerea*.

1. *VERNONIA ARBOREA*, Buch.-Ham. in Trans. Linn. Soc. XIV. 218. A tree, 30 to 60 feet high; young branches as thick as a goose-quill or thinner, at first covered, like the under surfaces of the leaves and branches of the inflorescence, with short rusty tomentum, sometimes glabrous or glabrescent. *Leaves* sub-coriaceous, entire, elliptic ovate or ovate-oblong, acute or shortly acuminate, the base rounded or cuneate; upper surface glabrous, or nearly so, except the midrib, the reticulations minute and distinct; main-nerves 8 to 14 pairs, spreading, interarching, bold and distinct on the lower surface, more faint on the upper; length 3.5 to 6 in.; breadth 1.75 to 2.75 in.; petioles .75 to 1.25 in., pubescent. *Heads* 2- to 5-flowered, collected in large open terminal panicles much longer than the leaves. *Involucral bracts* few, small, oblong, obtuse, less than half as long as the flowers, pubescent, concave, persistent. *Corolla* glabrous, bluish. *Cypselas* not conspicuously ribbed, short, truncate; pappus in a single row, tuberculate, white tinged with ochraceous, persistent. DC. Prod. V. 22; Kurz For. Fl. Burm. II. 80; Clarke Comp. Ind. 23; Hook. fil. Fl. Br. Ind. III. 239. *Vernonia javanica*, *Blumeana* and *celebica*, DC. l.c. 21, 22; Miq. Fl. Ind. Bat. II. 9, 10. *Eupatorium celebicum* and *javanicum*, Blume Bijdr. 903. *Conyza acuminata* and *arboorea*, Wall. Cat. 3034A and 3074.

MALACCA: Griffith. SINGAPORE: Lobb; Ridley 2735, 2739, 9478; Maingay (K.D.) 948, 949, 950. PENANG: Curtis 2, 926. NEGRI SEMBILAN: Ridley 10087. SELANGOR: Ridley. PERAK: Wray 2240, 2442; King's Collector, many Numbers; Scortechini.—DISTRIB. Ceylon, Malay Archipelago, Philippines, China.

2. *VERNONIA CHINENSIS*, Less. in Linnæa, VI. 674. An erect annual with divaricate, softly puberulous to tomentose, angled branches. *Leaves* alternate, sessile or petiolate, membranous, ovate elliptic elliptic-lanceolate or oblanceolate, narrowed at the base, sub-serrate or entire. *Heads* few, .35 in. in diam., in lax, few-branched, axillary and terminal, open puberulous cymes, on slender peduncles longer than the leaves, 15- to 30-flowered. *Involucral bracts* not numerous, lanceolate, awned or acute, usually at first pubescent outside, inside glabrous, shining, 1-nerved; longer than the glabrous or glabrescent corollas. *Cypselas* less than 1 in. long, 4- or 5-ribbed, glabrous. *Pappus* scanty, white. Clarke Comp. Ind. 78; Hook. fil. Fl. Br. Ind. III. 235. *V. albicans*, DC. in Wight Contrib. 6; Prod. V. 26 (*in part*). *Cyanopsis pubescens* and *C. villosa*, DC. Prod. V. 69. *Conyza chinensis*, Lamk. Dict. II. 83 (not of Linn.). *C. punctulata*, Wall. Cat. 2995. *Eupatorium menthaefolium*, Wall. Cat. *Cynanthidium villosum* and *C. pubescens*, Blume



Bijdr. 889 and 890. *Centratherum chinense*, Less. in Linnæa (1829) 320. *Synanthera*, Wall. Cat. 7136.

PENANG: *J. Scott*; *Curtis* 931; *King*; *Deschamps*; MALACCA: *Cuming*; *Griffith*; *Hullett* 634. SINGAPORE: *King*.—DISTRIB. Malay Archipelago, Philippines.

3. *VERNONIA CINEREA*, Less. in Linnæa, IV. 291, and VI. 673. Herbaceous, erect, 6 to 18 in. high, with more or less minute whitish pubescence everywhere; stems slender, striate. *Leaves* membranous with variable petioles, ovate or lanceolate, sometimes obovate or oblanceolate, the apex obtuse or acute, the edges obtusely or acutely toothed, the base narrowed, both surfaces olivaceous-cinereous when dry, the upper glabrous or nearly so, the lower more or less cinereous-pubescent; length 1·5 to 3 in.; breadth ·3 to ·5 in.; petiole ·1 to ·5 in. (in the lower leaves). *Heads* ·2 to ·25 in. in diam., on 10- to 20-flowered, loose, terminal, long-peduncled, corymbose cymes with divaricate branches; bracts of peduncle very few. *Involucral scales* linear-lanceolate, acuminate or almost awned, shorter than the florets, 1-nerved, ·1 in. long, densely pubescent. *Corolla* pubescent, the tube very narrow lavender. *Cypselas* minute; pappus copious, dirty white, the outer row very short. DC. Prod. V. 24, in Wight Contrib. 6; Wall. Cat. 3008; Hook. fil. Fl. Br. Ind. III. 234; Miq. Fl. Ind. Bat. II. 11; Prain Bengal Plants, 590. *V. conyzoides*, DC. in Wight Contrib. 6; Prod. V. 25. *V. rhomboidea* and *V. montana*, Edgew. in Trans. Linn. Soc. XX. 62. *V. albicans*, DC. in Wight Contrib. 6 (*in part*); Wight Ic. 1076. *V. abbreviata* and *leptophylla*, DC. l.c. 25. *V. laxiflora*, Less. in Linnæa, VI. 646; DC. l.c. 25. *V. physalifolia*, DC. in Wight Contrib. 6; Prod. Fl. Pen. Ind. Or. 24. *V. parviflora*, *linifolia*, and *fasciculata*, Reinw. in Bl. Bijdr. 893. *V. Zollingeriana*, Schultz-Bip. in Miq. Fl. Ind. Bat. II. 16. *V. cyanonioides*, Walp. in Linnæa XIV. 509. *Conyza abbreviata*, Wall. Cat. 3048; *C. bellidifolia*, id. 3047; *cinerascens*, 3062; *incana*, 3046; *linifolia*, 3063; *elegantula*, 3049; *ovata*, 3097, and *sub-simplex*, 3003. *C. cinerea*, Linn. Sp. Pl. 862; Wall. Cat. 3008. *C. prolifera* and *C. heterophylla*, Lam. Encyl. II. 84. *Serratula cinerea*, Roxb. Hort. Beng. 60. *Chrysocoma purpurea*, Forst. Prod. 54. *C. violacea*, Schum. Pl. Guin. 384. *Cyanopsis decurrens*, Zoll.

In all the provinces, in waste places near cultivation.—DISTRIB. All tropical countries.

## 2. ELEPHANTOPUS, Linn.

Perennial rigid herbs. *Leaves* alternate, sessile, penninerved, entire or dentate, mostly radical. *Heads* homogamous, each containing 1 to 5

flowers, and collected into ovoid or globose clusters, surrounded by several large leafy bracts. *Involucre-proper* compressed, its component bracts oblong, acute, about 8, dry, stiff, unequal, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed, and cleft on one side, and with the lobes spreading in a somewhat palmate manner. *Anthers* obtusely sagittate at the base. *Style-arms* subulate. *Cypselas* truncate, 10-ribbed; bristles of pappus few, rigid, shining, slender and dilated below or chaffy.—DISTRIB. 10 or 12 species, chiefly tropical American—one cosmopolitan.

ELEPHANTOPUS SCABER, Linn. Sp. Pl., 814. Stems dichotomous, from a few inches to 2 feet high, terete, finely strigose. *Leaves* membranous, the radical ones obovate, oblong to elliptic-oblong, tapering to the short petiole, the edges dentate or crenate, up to 6 in. in length and 1.25 to 2.5 in. broad; the cauline few, smaller, sessile, both sets scabrid on the upper surface and finely strigose on the lower; main-nerves 6 to 8 pairs in the cauline, more numerous in the radical leaves, all slightly prominent on the lower surface. *Collective heads* hemispheric, .5 to .75 in. in diam., solitary, terminal, on long peduncles. *Bracts* of the conjoined heads 3, leaf-like, about .5 in. broad, broadly ovate or reniform, apiculate, nervose and pubescent behind; bracts of the involucre-proper shining, glabrous; pappus of 5 shining tuberculate bristles, dilated at the base. Wall. Cat. 2979; DC. Prod. V. 86; Roxb. Fl. Ind. III. 445; Don Prod. 169; Wight Ic. 1086; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 590.

In all the provinces, in cultivated places.—DISTRIB. In most tropical countries.

### 3. ADENOSTEMMA, Forst.

Herbs, glandular-pubescent or glabrous. *Leaves* mostly opposite, petiolate. *Heads* homogamous, in lax corymbose cymes; involucre campanulate; its bracts numerous, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular, with short tube and campanulate 5-toothed limb. *Anthers* truncate, with glandular apiculus, their bases obtuse. *Style-arms* elongate, dilated near the apex. *Cypselas* obtuse, 5-ribbed, glandular; pappus of 3 to 5 short rigid, often clavate hairs, joined at their bases by a narrow ring.—DISTRIB. Species 5 or 6 American, 1 cosmopolitan.

ADENOSTEMMA VISCOSUM, Forst. Char. Gen. 20. An erect, rarely decumbent annual, slender or robust, glabrous; pubescent or viscidly pubescent. *Leaves* membranous, sessile or petiolate, opposite or the upper alternate, from linear to broadly ovate, acute sub-acute cuneate or cordate at the base, the edges serrate crenate or entire, the upper surface usually smooth but sometimes rugose; length from 2 to 6 in.;

petioles varying in length. *Heads* .3 to .4 in. in diam., in lax corymbose, pedunculate cymes. *Involucral bracts* oblong, obtuse or acute, glabrous, glandular or scabrid. *Corollas* white, pubescent near the mouth, styles much exserted, the arms clavate. *Cypselas* usually warted, crowned by a glandular ring, bearing pedicellate lobed glands. DC. Prod. V. 111; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 591.

In all the provinces, but not abundant in any of them.—DISTRIB. The tropics generally.

In the Flora of British India, III. 242, Sir Joseph Hooker recognises seven varieties of this widely distributed and variable species. And to one or other of these he reduces the following eleven species of De Candolle: *A. fastigiatum*, DC. Prod. V. 111, *A. leiocarpum*, *A. Roylei*, *A. elatum*, *A. latifolium*, l.c. p. 112, *A. macrophyllum*, *A. parviflorum*, *A. reticulatum*, *A. viscosum*, *A. madurense*, *A. erectum*, l.c. p. 113. He also reduces here the following: *Ageratum aquaticum*, Roxb. Fl. Ind. III. 415; *A. strictum*, Bot. Mag. t. 2410; *Lavenia fastigiata*, *macrophylla* and *parviflora*, Blume Bijdr. pp. 905 and 906; and the following Nos. of the Wallichian Catalogue, viz., *Lavenia erecta*, 3218; *carnosa*, 3219; *alba*, 3220; *rugosa*, 3221; *viscida*, 3222.

#### 4. AGERATUM, Linn.

Erect herbs. *Leaves* opposite in the lower part of the stem, alternate in the upper. *Heads* in panicles or corymbs, homogamous. *Involucre* narrowly campanulate; its bracts in 2 or 3 series, linear, subequal; receptacle convex, naked or with deciduous scales. *Corollas* all tubular, equal, regular, the limb 5-cleft. *Anthers* with slight apical appendages, their bases obtuse. *Style-arms* elongate, obtuse. *Cypselas* 5-angled; pappus of 5 short, free or connate scales, or of 10 to 20 narrow, unequal scales.—DISTRIB. About 20 species, all probably American, several introduced in the Tropics of the Old World.

AGERATUM CONYZOIDES, Linn. Sp. Pl. 839. Annual, 1 to 2 feet high, everywhere with sparse white, rather soft pubescence. *Leaves* membranous, ovate, sub-acute, the base broad and sub-truncate, sometimes cuneate; the edges coarsely crenate or dentate; both surfaces greenish when dry, the upper sparsely hispid; the lower glabrous, boldly reticulate; main-nerves about 2 or 3 pairs, ascending, curved, the lower one branching; length 1 to 3.5 in. *Heads* .25 in. in diam., in terminal or axillary corymbose cymes. *Involucral bracts* shorter than the flowers, narrowly lanceolate, acute, 3-nerved, puberulous. *Corollas* pale blue or white. *Cypselas* black; pappus of 5 shining, spreading scales, with broad, often serrate bases. DC. Prod. V. 108; Clarke Comp. Ind. 30; Wall. Cat. 3176; Hook. fil. Fl. Br. Ind. III. 243; Prain Bengal Plants, 591. *A. cordifolium*, Roxb. Fl. Ind. III. 415; Wall. Cat. 3177.

In all the provinces, in cultivated places.—DISTRIB. The tropics generally.

#### 5. MIKANIA, Willd.

A twining herb (in Indo-Malaya). *Leaves* opposite, petiolate. *Heads* small, in spikes racemes or panicles, homogamous, usually 4-flowered. *Involucre* oblong, its bracts 4, narrow, sometimes with a small outer one; receptacle small, naked. *Corollas* all equal, regular, tubular, the tube narrow; the limb campanulate, 5-fid. *Anthers* appendiculate, the base obtuse. *Style-arms* long, acute. *Cypselas* with truncate apices, 5-angled; pappus with one or more rows of scabrid hairs, often connate at the base.—DISTRIB. About 60 species, all in the warm parts of America and Africa except the following.

MIKANIA SCANDENS, Willd. Sp. Pl. 1743. A glabrous or puberulous climber; young branches less than half as thick as a goose-quill, brown and striate when dry. *Leaves* membranous, on long petioles, ovate, acuminate; the base broad, cordate, often almost sagittate, the edges sinuate; main-nerves a single pair, ascending from the base and branching outwards; length 1 to 2 in.; breadth .6 to 1.25 in.; petioles .5 to 1 in., slender. *Heads* narrow, 4-flowered, in lax corymbose cymes, on slender peduncles much longer than the leaves, peduncles and branches angled when dry, puberulous. *Scales of involucre* chaffy, narrowly oblong, obtuse. *Cypselas* glabrous; pappus reddish. DC. Prod. V. 199; Clarke Comp. Ind. 34; Hook. fil. Fl. Br. Ind. III. 244; Prain Bengal Plants, 592. *M. volubilis* and *M. chenopodifolia*, Willd. l.c. 1745; DC. l.c. 199 and 201. *Eupatorium scandens*, Linn.; Jacq. Ic. t. 169.

In all the provinces, common.—DISTRIB. British India, Malay Archipelago, Tropical Africa.

#### 6. DICHROCEPHALA, DC.

Annuals, with alternate toothed lyrate or pinnatifid leaves. *Heads* small, heterogamous, globose or hemispheric, not rayed, in panicles; *Outer florets* ♀, in many rows, slender, fertile, rigid, 2-3-toothed or cleft. *Disk-florets* ♂, fertile, narrow, 4- or 5-toothed. *Anthers* with truncate bases. *Style-arms* of ♂ florets short, flattened, the tips lanceolate; pappus none or (in the ♂) of 2 minute bristles.—DISTRIB. Species 5, Asiatic and African.

DICHROCEPHALA LATIFOLIA, DC. in Guill. Archiv. Bot. II. 518. An annual weed, 12 to 24 in. high, erect or spreading, glabrous pubescent or villous. *Leaves* very variable, ovate lanceolate or obovate, entire pinnatifid or lyrate, with the terminal lobe broadly ovate and coarsely

toothed; length 1 to 4 in.; petioles .25 to 1.25 in. *Heads* about .15 in. in diam., globose, on pedicels many times longer than themselves, in lax, few-branched, cymose panicles. *Ray-florets* ♀, filiform, obscurely 2-3-toothed, white. *Disk-florets* ♂, 4-cleft, yellow. *Cypselas* very small, smooth, with a callous margin, and often with 2 small bristles. DC. in Wight Contrib. 11, Prod. V. 372; Wight Ic. 1096; Clarke Comp. Ind. 36; Hook. fil. Fl. Br. Ind. III. 245. *D. gracilis* and *D. sonchifolia*, DC. l.c. 371, 372. *Cotula sinapifolia*, Roxb. Hort. Beng. 63, Fl. Ind. III. 437; Wall. Cat. 3237. *C. bicolor*, Roth Cat. Bot. II. 116. *C. latifolia*, Pers. Syn. II. 464. *Grangea latifolia*, Lam. Ill. t. 699. *Hippia bicolor*, Smith in Rees Cyclop. XVIII. *Ethulia integrifolia*, Don Prodr. 182.

PERAK: *Scortechini*.—DISTRIB. British India, tropical and sub-tropical Asia and Africa.

## 7. MICROGLOSSA, DC.

Slender shrubs, often scandent. *Leaves* alternate, entire. *Heads* small, heterogamous, collected in large corymbose panicles. *Ray-florets* ♀, in 1 or more series, fertile, the ligule minute, white. *Disk-florets* few or many, ♂, fertile, tubular, with dilated 3- to 4-fid limb. *Involucre* campanulate, composed of several series of narrow bracts, the outer shorter. *Receptacle* flat, naked or nearly so. *Corolla*, the ligulate or ray ones narrow, about as long as the style; those of the disk (the tubular) longer. *Anthers* with obtuse bases, entire. *Style-arms* of the ♀ flattened; their tips long, lanceolate. *Cypselas* angled; pappus hairs numerous, slender, silky, in one or two series, somewhat unequal.—DISTRIB. About 6 species, Asiatic and African.

MICROGLOSSA VOLUBILIS, DC. Prod. V. 320. A sub-scandent shrub; branches half as thick as a goose-quill, ridged, glabrous. *Leaves* membranous, ovate-lanceolate, acuminate, the base cuneate or rounded, the edges obscurely toothed; both surfaces brown when dry, glabrous, the lower sometimes slightly pubescent; main-nerves 4 or 5 pairs, little curved, ascending, prominent beneath; length 1.5 to 2 in.; breadth .65 to 1.25 in.; petioles .25 to .4 in., slender. *Heads* .35 in. in diam., on short peduncles, crowded in dense corymbose terminal cymes, much longer than the leaves. *Cypselas* compressed, 4-angled, puberulous; pappus copious, reddish, much longer than the minute achenes. Clarke Comp. Ind. 57; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 257. *Conyza volubilis*, Wall. Cat. 3057. *Erigeron pyrifolius*, Benth. Fl. Hongk., 176.

PERAK: *Ridley* 2890; *Wray* 2472. PENANG: *Wallich* 3057.—DISTRIB. British India, Burma, Malay Archipelago, China.

## 8. BLUMEA, DC.

Herbs, annual or perennial, glandular-pubescent or woolly. *Leaves* alternate, rarely entire, usually lobed or toothed. *Heads* in paniculate cymes, rarely in racemes, heterogamous, disciform, yellow or purplish. *Ray-florets* in several series, ♀, fertile, filiform, 2- or 3-toothed. *Disk-florets* ♂, few, fertile, with slender tube and 5-toothed limb. *Involucre* ovoid or campanulate; its bracts in several rows, narrow, acute, herbaceous, the outer smaller; receptacle flat, naked. *Anthers* with sagittate bases produced into small slender tails. *Style-arms* of the hermaphrodite flower flattened or filiform, rarely connate with the nearest anthers. *Cypselas* small, sub-terete or angular, with or without ridges; pappus hairs in a single row, slender, often caducous. —DISTRIB. About 60 species, in tropical and sub-tropical Asia, Africa, and Australia.

Scandent; pappus white .. .. .	1. <i>B. chinensis</i> .
Large shrub; pappus red .. .. .	2. <i>B. balsamifera</i> .
Erect herbs; pappus white:—	
Heads in small sessile clusters of 2 or 3 in the axils of small bracts on an elongated pseudo-spike .. .. .	3. <i>B. glomerata</i> .
Heads few (1 to 6), in short, axillary, condensed, pedunculate cymes; leaves oblanceolate or obovate, dentate but not lobed; flowers purple .. .. .	4. <i>B. Wightiana</i> .
Heads sessile or sub-sessile, in lax, shortly-branched, leafy cymose panicles; leaves oblanceolate, dentate but not lobed; flowers yellow .. .. .	5. <i>B. lacera</i> .
Heads sessile or sub-sessile, in axillary spikes several inches long, arranged in a pseudo-panicle; leaves oblanceolate, dentate and sometimes lobulate; flowers yellow .. .. .	6. <i>B. membranacea</i> .

1. *BLUMEA CHINENSIS*, DC. Prod. V. 444. Scandent; young branches half as thick as a goose-quill, glabrous, much striate and dark brown when dry. *Leaves* membranous, elliptic or oblong-elliptic, acuminate or acute, narrowed to the rounded base, the edges with remote, narrow, small sharp teeth, or sub-entire; both surfaces glabrous, the upper dark-brown and shining, the lower paler and tinged olivaceous; main-nerves 4 or 5 pairs, curved, ascending, thin but distinct on the lower surface, faint on the upper; length 2.25 to 3.25 in.; breadth .85 to 1.4 in.; petiole .2 to .3 in. *Heads* .35 in. across, sessile, in small pedunculate axillary cymes, 3 in. long, diminishing upwards to .75 in. in length; the peduncles and their branches everywhere pubescent, sometimes a small cyme with 2 to 4 heads in the same axil as a longer one. *Involucral bracts* of the outer two series short, ovate-lanceolate, blunt, densely pubescent, those of the inner two twice as long

(or more), linear-lanceolate, acuminate, puberulous or almost glabrous, 1-nerved, longer than the copious white pappus; corolla-lobes hairy; receptacle and *cypselas* silky, white. Hook. fil. Fl. Br. Ind. III. 268. *Conyza chinensis*, Linn. Sp. Pl. 862; Blume Bijdr. 898. *B. longispina*, Zoll. et Morr. Syst. Verz. 121. *C. serici-vestita*, Wall. Cat. 2996B. *Baccharis nitida*, Wall. Cat. 3043.

PENANG: *Curtis* 2824; *Wallich* 2996, 3043. SINGAPORE: *Ridley* 2744. PERAK: *Scortechini* 1471.

VAR. *riparia*, King & Gamble. Young leaves and stems somewhat hairy; main-nerves of leaves 3 to 4 pairs, depressed on the upper surface. *Blumea riparia*, DC. Prod. V. 444; Clarke Comp. Ind. 85. *Conyza riparia*, Blume Bijdr. 899.

PERAK: *King's Collector* 1214; *Scortechini*.—DISTRIB. Java, Borneo.

2. *BLUMEA BALSAMIFERA*, DC. Prod. V. 466. A shrub, 6 to 12 feet high; young branches nearly as thick as a goose-quill, tomentose, striate. Leaves thickly membranous or sub-coriaceous, elliptic-lanceolate, coarsely and unequally serrate dentate or sub-entire, acute or sub-acute, narrowed at the base; upper surface dark olivaceous-green, minutely tomentose or strigose, the lower surface with dense silky cinereous-yellowish tomentum; main-nerves 7 to 10 pairs, curved, ascending, faint on both surfaces, but especially on the lower; length 2 to 3 in.; breadth .75 to 1.5 in.; petioles .2 to .75 in. long, the longer ones often with lateral auricles; in the lower part of the branches the leaves often much larger. Heads sub-cylindric, sessile, or on short pedicels, arranged in large, lax, and spreading or dense, often leafy, corymbose or paniced, axillary and terminal tawny-tomentose cymes. Involucral bracts linear, acuminate, densely tomentose; hermaphrodite florets very numerous in the centre, narrowly tubular; receptacle naked. *Cypselas* 10-ribbed, silky; pappus copious, red. Clarke Comp. Ind. 89; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 270; Prain Bengal Plants, 598. *Conyza balsamifera*, Linn. Sp. Pl. ed. II. 1208; Wall. Cat. 2998; Roxb. Fl. Ind. III. 427. *C. vestita*, Wall. Cat. 2998. *C. appendiculata* Blume Bijdr. 895 (not of Lam.).

MALACCA: *Griffith* (K.D.) 3143; *Hervey*. PENANG: *Walker* 160; *Scott*; *Curtis* 29. PERAK: *Scortechini*; *King's Collector* 6343; *Wray* 1741. SINGAPORE: *G. Thomson*; *Hullett* 372; *Ridley* 2742. JOHORE: *King*.—DISTRIB. British India, Malay Archipelago.

VAR. *angustifolia*, King & Gamble. Leaves narrowly oblong, acute at both ends, less than .5 in. broad.

SINGAPORE: *Ridley* 2742.

3. *BLUMEA GLOMERATA*, DC. in Wight Contrib. 15. An erect

herb, about 18 to 24 in. high; stem at the base nearly as thick as a goose-quill, sparsely sub-glandular-pubescent, the hairs spreading. *Leaves* membranous, olivaceous, sparsely strigose on both surfaces, the hairs on the upper surface with bulbous bases; the lower sessile, lyrate-lyobed, the lobes dentate, the apex acute; the upper leaves much smaller, lanceolate, dentate. *Heads* from .2 to .25 in. in diam., in small sessile clusters of 2 or 3, all in the axils of small leaf-like bracts along the long slender branches, forming a pseudo-spike. *Involucral bracts* narrowly linear, pubescent, 1-nerved; receptacle glabrous. *Outer florets* with very slender corollas. *Cypselas* faintly 8-10-ribbed, glabrous; pappus in a single row, white, shining. DC. Prod. V. 443; Hook. fil. Fl. Br. Ind. III. 262. *B. fasciculata*, DC. l.c. 442; Clarke Comp. Ind. 81. *B. fistulosa*, Kurz in Journ. As. Soc. Beng. 1877, II. 187. *B. holosericea*, *racemosa*, *spinellosa*, *gracilis*, *purpurea*, and *leptoclada*, DC. l.c. 442, 443. *Conyza fistulosa*, Roxb. Fl. Ind. III. 429. *Conyza racemosa*, *sericea*, *glomerata*, *gracilis*, *purpurea* and *holosericea*, Wall. Cat. 3002, 3021, 3055, 3064, 3076, 3103.

PENANG: Deschamps.—DISTRIB. British India, Malay Archipelago, China.

4. *BLUMEA WIGHTIANA*, DC. in Wight Contrib. 14. An erect, little-branched herb, 1 to 3 feet high, covered everywhere with silky white, scanty or copious, soft, sub-adpressed hairs; stem terete, about as thick as a goose-quill at the base, striate, brown, and nearly glabrous (from the fall of the hairs) when old. *Leaves* diminishing in size from below upwards, thickly membranous, obovate-oblong or elliptic-obovate, the apex acute or sub-acute, gradually narrowed from about the middle to the short petiole; the edges with a few irregular coarse teeth, sometimes slightly lobed; both surfaces olivaceous-brown when dry, and clothed, but especially the lower, with adpressed, short white pubescence; main-nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petioles from .1 to .25 in. long or even more, sometimes auricled about the middle. *Heads* paniculate, about .3 or .4 in. across, axillary, solitary or in pairs (reduced cymes), or 4 to 6 in very short rounded axillary cymes on peduncles of varying length, but always short, the upper few inches of the stem crowded by a dense mass of cymes. *Involucral bracts* in several rows, diminishing in size outwards, the inner linear, somewhat longer than the pappus, all pubescent and 1-nerved; receptacle naked. *Outer florets* very numerous, their corollas very slender. *Inner florets* about 4, much wider than the outer. *Cypselas* small, puberulous; pappus in a single row, white. DC. Prod. V. 435; Clarke Comp. Ind. 74; Kurz in Journ. As. Soc. 1877, II. 156 (excl. syn. *hymeno-*



*phylla*); Hook. fil. Fl. Br. Ind. III. 261. *B. trichophora*, *parvifolia*, and *phyllostachya*, DC. l.c. 436, 437, 438. *Conyza lactucifolia*, *paniculata*, *bifoliata*, and *Wightiana*, Wall. Cat. 3088 (*in part*), 3090A, 3091, 3093. *Erigeron molle*, Don Prod. 172.

PENANG and SINGAPORE: By roadsides, not common.—DISTRIB. British India and Ceylon, Malay Archipelago, tropical Australia and Africa.

5. *BLUMEA LACERA*, DC. in Wight Contrib. 14. An erect herb, 2 to 3 feet high; stems at the base nearly as thick as a goose-quill, adpressed-pubescent. *Leaves* thickly membranous, oblanceolate obtuse or sub-acute, much narrowed to the petiole, the edges unequally and remotely dentate; both surfaces olivaceous when dry, the lower somewhat the paler and with thin, pale pubescence; the upper glabrous, sub-scabrid; length 1·5 to 2 in.; breadth ·5 to 1 in.; petiole ·3 to ·5 in. long. *Heads* ·3 in. across, sub-sessile or sessile, in small rounded crowded cymes, on slender ebracteate axillary peduncles, 1 to 2·5 in. long, subtended by small leaf-like bracts, and occupying the upper half of the stem. *Involucral bracts* linear-oblong, tomentose, about as long as the pappus; receptacle naked. *Heads* ·4 in. across, sessile or nearly so, in a lax, shortly-branched, leafy, cymose, pubescent panicle, 12 to 18 in. long. *Involucral bracts* nearly uniform, linear, acuminate, 1-nerved, puberulous, as long as the pappus. *Receptacle* slightly convex, naked. *Cypselas* narrowly oblong, glabrous, not ribbed; pappus in a single row, white. DC. Prod. V. 436; Clarke Comp. Ind. 76; Hook. fil. Fl. Br. Ind. III. 263. *B. Musra*, DC. l.c. 435; Deless. Ic. Sel. IV. t. 23. *B. villosa*, Schultz-Bip. in Pl. Hohenack. n. 2a. *Conyza lacera*, Roxb. Fl. Ind. III. 428; Wall. Cat. 3082. *C. thyrsiflora*, *villosa*, and *Musra*, Ham.; Wall. Cat. sub 3082, 3083, 3095. *C. lactucifolia*, DC. l.c. 435; Wall. Cat. 3088 (*in part*); Burm. Fl. Ind. 180, t. 59, f. 1.

PERAK: *Scortechini* 141, 1430. SINGAPORE: *Cantley*; *Hullett* 227.—DISTRIB. British India, Ceylon, Malay Archipelago, China, tropical Africa.

6. *BLUMEA MEMBRANACEA*, DC. Prod. V. 440. A rigid erect herb, 1 to 2 feet high; stem at the base half as thick as a goose-quill, minutely pubescent from base to apex, terete, striate. *Leaves* thinly membranous, oblanceolate, much tapered to the base, sub-sessile, the apex acute, the edges coarsely and often irregularly dentate, sometimes lobulate; both surfaces pale olivaceous-brown when dry, the lower paler, sparsely strigose; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; length 2 to 3·5 in.; breadth ·8 to 1·5 in.; the leaves of the upper part of the stem smaller and bract-like. *Heads* ·25 in. in diam., sessile or sub-sessile, in spikes several inches long, from the

axils of small leaf-like bracts, arranged in a narrow pseudo-panicle occupying the upper half of the stem. *Involucral bracts* linear, acuminate, pubescent, 1-nerved, as long as the inner pappus. *Corollas* very narrow; receptacle naked. *Cypselas* small, glabrous; pappus white, in two rows, the outer very short. Hook. fil. Fl. Br. Ind. III. 265. *B. hymenophylla*, DC. l.c. 440. *Conyza membranacea* and *hymenophylla*, Wall. Cat. 3019, 3038. *C. virens*, Wall. Cat. 3037D. *C. diffusa*, Roxb. Fl. Ind. III. 429.

PENANG: Curtis 2759; Deschamps.—DISTRIB. British India, Malay Archipelago.

#### 9. LAGGERA, Schultz.-Bip.

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent. *Heads* paniced or axillary, heterogamous, disciform. *Outer flowers* ♀, in several rows, fertile, filiform, the mouth minutely toothed. *Disk-flowers* ♂, in several rows, fertile, tubular, 5-fid. *Involucre* campanulate; bracts many-rowed, narrow, often rigid, the outer shorter; receptacle flat, naked. *Anthers* 2-lobed or sagittate at the base; the auricles obtuse or acute, often unequal, not tailed or connate with the adjoining anthers. *Style-arms* of the hermaphrodite flowers and the pappus as in *Blumea*.—DISTRIB. 9 or 10 species, in tropical Africa and British India.

LAGGERA FLAVA, Benth. in Gen. Pl. II. 290. A glabrous or puberulous herb, 6 to 30 in. high; stems striate, simple or corymbosely branched. *Leaves* membranous, shining, glabrous; the radical sometimes on short petioles; the cauline sessile; the lower cauline oblong, acute, cordate and sub-amplexicaul at the base; the upper cauline smaller and narrower than the lower, lanceolate; all sharply and unequally toothed; main-nerves about 8 pairs, distinct, like the wide reticulations. *Heads* few, 25 in. in diam., on slender peduncles; receptacle glabrous; corollas yellow; anthers sagittate. *Cypselas* minute, glabrous. Clarke Comp. Ind. 90; Hook. fil. Fl. Br. Ind. III. 270. *Blumea flava*, DC. Prod. V. 439. *Erigeron falcatum*, Don Prod. 172; Kurz in Journ. As. Soc. Beng., 1877, II. 191 (*excl. syn.*). *Conyza fasciculata*, Wall. Cat. 3017.

PENANG: Wallich.—DISTRIB. British India.

This has not been collected within our area since Wallich's time.

#### 10. PLUCHEA, Cass.

Shrubs or herbs, tomentose or glutinous. *Leaves* alternate, dentate or rarely entire, sometimes pinnatifid. *Heads* usually small, in terminal corymbose cymes, or large and sub-solitary, heterogamous, disci-

form, white yellow, or lilac. *Outer florets* ♀, in several series, fertile, filiform. *Disk-florets* ♂, few, sterile, tubular and 5-fid. *Involucre* broadly ovoid or campanulate; its bracts few or in many rows, imbricate, ovate or lanceolate, dry, rigid; receptacle flat, naked. *Corollas* of the ♀ flowers filiform, shorter than their own styles, their apices with 3 teeth; *corollas* of the ♂ flowers regular, tubular, the limb slightly widened, 5-cleft. *Anthers* sagittate at the base, their basal auricles tailed. *Style-arms* of the ♂ flowers filiform, entire or bifid. *Cypselas* small, 4- or 5-angled. Hairs of *pappus* slender, rigid, in a single series, free, or (in the sterile cypselas) connate in groups.—DISTRIB. About 30 species, tropical and sub-tropical.

*PLUCHEA INDICA*, Less.; DC. Prod. V. 451. A low shrub, glabrous or nearly so; stems smooth, terete. *Leaves* membranous, obovate or oblanceolate, the apex obtuse or acute, acuminate or apiculate, narrowed to the base; edges dentate, serrate or sub-serrate; both surfaces olivaceous-brown when dry, glandular; main-nerves 3 to 6 pairs, curving upwards, bold beneath; length .5 to 2.75 in.; breadth .3 to 1.25 in.; petioles .1 in. to .4 in. long. *Heads* .25 in. in diam., in compound terminal puberulous corymbose cymes, much longer than the leaves; involucre bracts few, rather broad, obtuse. *Florets* of the disk 3; those of the ray numerous. *Cypselas* minute, ribbed, nearly glabrous; pappus scanty, spreading, reddish-white. Wight Ill. t. 131; Clarke Comp. Ind. 93; Hook. fil. Fl. Br. Ind. III. 272; Prain Bengal Plants 600. *P. foliosa*, DC. l.c. 451. *Conyza corymbosa*, Roxb. Fl. Ind. III. 426; Wall. Cat. 3009. *C. indica*, Miq. Fl. Ind. Bat. II. 58. *Baccharis indica*, Linn.

MALACCA: Griffith. PENANG: Wallich. SINGAPORE: Kurz. DINDINGS: Curtis 3451. PERAK: Scortechini 848; King's Collector 2893.—DISTRIB. British India, Malay Archipelago, China, Australia

# 11. SPHERANTHUS, Linn.

Annual herbs with spreading branches. *Leaves* alternate, toothed, decurrent. *Flower-heads* proper, small, heterogamous, disciform, sessile, on a common receptacle, bracteate or not, and forming solitary, globose, or ovoid, a head-like terminal cluster, usually bearing at its base an involucre of a few empty bracts. *Outer florets* ♀, few or many, fertile, slender; *inner* solitary or few, ♂, fertile or sterile; involucre narrow, its bracts dry, narrow, unequal, acute; receptacle small, naked; pappus none. *Florets*: ♀ with filiform, minutely 2-3-toothed corollas; ♂ with regular corollas with thickened tube and 4-5-toothed limb. *Anthers* with sagittate bases acute or tailed. *Style* of ♂ florets with filiform arms or entire. *Cypselas* oblong, sub-

compressed, without pappus.—DISTRIB. About 8 species, tropics of Asia, Africa, and Australia.

*SPHÆRANTHUS AFRICANUS*, Linn. Sp. Pl. 1314. Annual, glabrous or pubescent, the stem and branches with long decurrent, entire wings. *Leaves* membranous, oblanceolate, acute or sub-acute, with a small bristle-point at the apex, the base narrowed and confluent with the wing of the branch, the edges bristle-serrate; length 1 to 3 in.; breadth .25 to 1.25 in. *Clusters of heads* globose, .3 to .4 in. in diam., pedunculate, their involucre few, scarious, rounded or jagged, not imbricate; the peduncles .25 to .4 in. long, glabrous, with a wing widening at the base. *Female florets* about 15, gibbous. Hook. fil. Fl. Br. Ind. III. 275; Prain Bengal Plants, 601. *S. africanus* and *S. microcephalus*, Willd. Sp. Pl. III. 2395. *S. microcephalus*, DC. Prod. V. 360; Clarke Comp. Ind. 97. *S. indicus*, Willd. l.c. 2394; Roxb. Hort. Beng. 62, Fl. Ind. III. 446. *S. africanus*, Wall. Cat. 3179 (*in part*).

MALACCA: *Griffith*. KEDAH: *King's Collector* 1701. SINGAPORE: *Ridley* 5069. PENANG: *Curtis* 1942; *Deschamps*. PROVINCE WELLESLEY: *Ridley* 7125. PERAK: *Scortechini* 1640.—DISTRIB. British India, Malay Archipelago, China, Philippines, Australia, Africa.

## 12. EMILIA, Cass.

Annual or perennial herbs, glabrous or hairy, often glaucous, sometimes sarmentose. *Leaves* alternate, radical, crowded, petiolate, entire, toothed or lyrate-pinnatifid; cauline few, stem-clasping. *Heads* on long peduncles, solitary or loosely corymbose, ebracteolate at the base, homogamous, discoid, yellow or red; florets all ♀, fertile, tubular, the limb elongate and 5-toothed. *Involucre* cylindric; its bracts in a single series, equal, free or cohering, striate; *receptacle* flat, naked. *Style-arms* sub-terete, their apices short and obtuse, or long and acute. *Cypselas* sub-terete, or 5-ribbed or -angled; pappus hairs numerous, white, silky.—DISTRIB. Species 14 or 15; all Indo-Malayan and tropical African.

*EMILIA SONCHIFOLIA*, DC. Prod. VI. 302. Annual, usually erect, sometimes diffuse and sarmentose, 12 to 30 in. high. *Leaves*: the lower lyrate-pinnatifid or sinuate-dentate, rarely elliptic, glabrous or puberulous, sometimes scaberulous, 1.5 to 4 in. long; petioles variable but rarely exceeding an inch in length; cauline leaves much smaller, hastate or linear-hastate, dentate, sessile and auriculate, more or less stem-clasping. *Heads* .4 in. long and the same in diam. when expanded, on long ebracteate or scantily bracteate peduncles, collected in lax terminal long pedunculate spreading corymbs. *Involucre* nearly as long as the purple florets, ecalyculate; its bracts linear-oblong, sub-

acute. *Cypselas* truncate at each end, minutely hairy. DC. in Wight Contrib. 24. *E. sonchifolia*, vars.  $\alpha$  and  $\beta$ , Clarke Comp. Ind. 174. *Calcalia sonchifolia*, Linn. Sp. Pl. 835; Roxb. Fl. Ind. III. 413; Don Prod. 180; Wall. Cat. 3144. *E. glabra*, Heyne in Wall. Cat. 3145. *Gynura ecalyculata*, DC. l.c. 298. *Prenanthes sarmentosa*, Wall. Cat. 3262E. *E. scabra*, DC. l.c. 303; Wight Ic. 1123. *E. mucronata*, Clarke Comp. Ind. 175.

SINGAPORE: *Hullett* 240. PENANG: *Deschamps*; *Scortechini*; *Stolickza*.—DISTRIB. British India, Malay Archipelago, China.

VAR. *minor*, King & Gamble. Little more than a foot high, lower leaves broadly ovate, truncate at the base, on long narrow winged petioles.

PERAK: *King's Collector* 301. PENANG: in Klang and Batu Gajah jungles: *Deschamps*.

In this variety the terminal lobe only of the leaf is developed, the lower part being long and narrow like a petiole.

### 13. GYNURA, Cass.

Succulent herbs, rarely undershrubs, sometimes climbers, glabrous or hispid. *Leaves* alternate, entire, toothed or pinnatisect. *Heads* solitary or in corymbs, bracteolate at the base, homogamous, disciform, yellow or purplish. *Florets* yellow: all the  $\sigma$  tubular, fertile (rarely a few of the outer ones more slender and  $\rho$ ) the limb 5-toothed. *Involucre* cylindric or sub-campanulate; the bracts 10 or 12, in a single series, narrow, equal; their margins scarious; receptacle flat, pitted or shortly fimbriate. *Anthers* with bases entire or sub-auricled. *Style-arms* slender; their apices long, slender, subulate, hispid. *Cypselas* narrow, many-ribbed; hairs of pappus copious, in many series, slender, white.—DISTRIB. Species about 20, Asia, Africa, and Australia.

Scandent; leaves subentire or slightly dentate, petiolate .. 1. *G. sarmentosa*.

An erect herb; leaves always boldly dentate and often pinnatisect or pinnatifid, sessile and often sub-amplexicaul or auriculate .. 2. *G. bicolor*.

1. GYNURA SARMENTOSA, DC. Prod. VI. 298. Stem and branches loosely twining, glabrous except the puberulous peduncles, thinner than a goose-quill, pale brown and striate when dry. *Leaves* succulent, elliptic to elliptic-lanceolate, acute or acuminate, the base cuneate, the edges subentire or slightly dentate, both surfaces brown when dry, glabrous; main-nerves 4 or 5 pairs, spreading, faint on both surfaces; length 1 to 3 in.; breadth  $\frac{1}{4}$  to 1 in.; petioles of the lower leaves  $\frac{1}{5}$  to  $\frac{1}{4}$  in.; the small upper leaves often sessile. *Heads* few,  $\frac{1}{65}$  to  $\frac{1}{75}$  in. long, and as much in diam., on slender puberulous

pedicels usually in scanty, lax, long-peduncled, axillary and terminal cymes longer than the leaves; bracteoles of the panicle and of the calyculus at the base of the involucre few, small, linear. *Involucre* spreading little, its bracts narrowly oblong, subacute or blunt, glabrous; their edges scarious, nearly as long as the florets. *Cypselas* small, brown, with 10 puberulous ribs; pappus white. Hook. fil. Fl. Br. Ind. III. 335. *G. Finlaysoniana*, DC. l.c. 299; Deless. Ic. Sel. IV. t. 55. *Cacalia cylindrifolia*, *reclinata*, and *Finlaysoniana*, Wall. Cat. 3150, 3151, 3162. *Sonchus volubilis*, Rumph. Herb. Amb. V. t. 103 f. 2.

In all the provinces, common.—DISTRIB. Malayan Archipelago; Siam; Philippines.

2. GYNURA BICOLOR, DC. Prod. VI. 299. Herbaceous, 2 or 3 feet high, glabrous or sparsely and minutely glandular-hairy on the upper part; stems erect, branched, about the thickness of a quill near the base, boldly striate when dry. *Leaves* pinnatisect or pinnatifid, the lobules acutely dentate; the terminal lobe narrow and acuminate, narrowed at the base into a petiole varying in length from .5 to 1 in.; the upper sessile and often auriculate at the base, or shorter and narrowly obtuse with large teeth; length 2.5 to 5 in.; breadth .4 to 3 in. *Heads* about .5 in. long, less in diam. Involucral bracts narrow, with scarious margins and acute often recurved tips. *Cypselas* very slender, much ribbed, sub-glabrous; pappus copious, white, tinged with pink. Hook. fil. Fl. Br. Ind. III. 335. *Cacalia bicolor*, Roxb. Fl. Ind. III. 412; Salisb. Hort. Parad. t. 25; Bot. Regist. t. 110.

SINGAPORE: Ridley 1618. JOHORE: Ridley 2741; King. PERAK: Wray 1445, 3599. PENANG: Deschamps. MALACCA: Griffith (K.D.), 3235.—DISTRIB. China, Moluccas.

#### 14. SIEGESBECKIA, Linn.

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, sub-radiate, yellow or white. *Ray-florets* ♀, in a single series, fertile, the corollas short-tubed, with 2-3-fid limb or a short, broad ligule. *Disk-florets* ♂, fertile, or the inner ones sterile; the corollas regular, tubular, the limb campanulate and 5-fid or narrow and 3- to 4-toothed. *Involucre* campanulate or hemispheric, the bracts few, herbaceous, glandular, the outer usually 5, spatulate, spreading; the inner enclosing the ray-florets. *Receptacle* small; the pales membranous, concave. *Anthers* with entire bases. *Style* of ♂ *florets* with short, flattened, sub-acute arms. *Cypselas* obovoid-oblong, often incurved, their apices obtuse;

pappus none.—DISTRIB. Six species, one cosmopolitan, tropical and sub-tropical, the others South American and African.

*SIEGESBECKIA ORIENTALIS*, Linn. Sp. Pl. 900. An erect annual, 1 to 3 feet high, branching, the lower branches opposite, everywhere clothed with pubescence, often glandular and crisped. *Leaves* membranous, opposite, the lower ovate sub-rhomboid, the upper ovate-lanceolate, dentate or crenate, passing into linear-lanceolate, and sometimes entire; all cuneate at the base; both surfaces olivaceous when dry; the upper scabrid, hispid; the lower more softly hairy; main-nerves 3 or 4 pairs, curved, spreading; length 1 to 4 in.; petioles very short or absent. *Involucre* with the outer bracts longer than the inner. *Cypselas* black, the outer enclosed in the glandular involucre bracts. Boiss. Fl. Orient. III. 250; DC. Prod. V. 495; Wight Ic. 1103; Wall. Cat. 3182; Hook. fil. Fl. Br. Ind. III. 304; Prain Bengal Plants, 607. *S. glutinosa*, Wall. Cat. 3182. *S. brachiata* and *S. orientalis*, Roxb. Fl. Ind. III. 432. *Minyranthes heterophylla*, Turcz. in Bull. Soc. Imp. Nat. Misc. 1851, I. 181.

In all the provinces, near habitations.

#### 15. ECLIPTA, Linn.

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, pedunculate, heterogamous, rayed. *Ray-florets* ♀, sub-2-seriate, fertile or sterile, ligulate, small, entire or bifid, white rarely yellow. *Disk-florets* ♂, fertile, tubular, 4–5-fid. *Involucre* hemispheric or broadly campanulate; its bracts sub-2-seriate, herbaceous, the outer large and broad; receptacle flat or nearly so, the outer pales enclosing several florets; the inner ones narrow, sometimes absent. *Anthers* with obtuse, almost entire, bases. *Style-arms* flattened, with short triangular or obtuse appendages. *Cypselas* of the ray narrow, triquetrous, sometimes barren; those of the disk stouter, somewhat compressed laterally, the apex entire, toothed or 2-aristate.—DISTRIB. 7 species in South America and Australia, and 1 cosmopolitan in the tropics.

*ECLIPTA ERECTA*, Linn. Mant. II. 266. An erect or diffuse branched slender herb, hirsute or strigillose. *Leaves* variable in form and size, sessile or with very short petioles; linear, oblong-lanceolate or narrowly elliptic; narrowed at both ends; main-nerves 3 or 4 pairs, spreading, faint; length 1 to 4 in.; breadth .2 to .5 in. *Heads* .3 to .4 in. in diam., solitary or in pairs from the leaf-axils; the peduncles .25 to 1.5 in. long, when in pairs always unequal. *Involucre bracts* equal to or longer than the flowers, unequal, ovate or obovate, apiculate. *Cypselas* scabrid, without pappus. Clarke Comp. Ind. 134; Hook.

fil. Fl. Br. Ind. III. 304; Prain Bengal Plants; 610. Lam. Ill. t. 687. *E. alba*, Hassk. Pl. Jav. Bar. 528; Clarke Comp. Ind. 134; Hook. fil. Fl. Br. Ind. III. 304. *E. marginata*, Boiss. Fl. Orient. III. 249. *E. prostrata*, Linn. Mant. II. 266; Roxb. Fl. Ind. III. 438. *E. prostrata*, *undulata*, and *parviflora*, Wall. Cat. 3209, 3210, 3213. *Verbesina alba* and *prostrata*, Linn. Sp. Pl. 902.

In all the provinces. In and near cultivated ground.—DISTRIB. The tropics generally.

#### 16. WEDELIA, Jacq.

Hirsute or scabrid-pubescent herbs or undershrubs, sometimes scandent. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate, spreading, entire, or 2-toothed at the apex. *Disk-florets* ♂, fertile or the inner sterile; the corolla tubular, regular, with elongate 5-toothed limb. *Involucre* campanulate or sub-hemispheric; its bracts sub-2-seriate, the outer 3 to 5 usually herbaceous, the inner dry; receptacle flat or convex, the pales enclosing the flowers. *Anthers* entire or sub-sagittate at the base. *Style* of ♀ florets with acute arms hirsute at their tips. *Cypselas* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus none, or reduced to a toothed cup or ring, or sometimes of short scales with occasionally a few bristles.—DISTRIB. Species about 70, tropical and sub-tropical.

WEDELIA BIFLORA, DC. in Wight Contrib. Fl. Ind. 18. Scandent; stem and branches hispid-puberulous when very young, afterwards almost glabrous, obtusely 4-angled, grooved when dry. *Leaves* membranous, broadly ovate or ovate-subrhomboid to lanceolate, apex acuminate, edges coarsely serrate except at the broad, slightly cuneate base; both surfaces dull olivaceous green when dry, minutely reticulate, sparsely hispid-puberulous; main-nerves one large pair ascending from the base of the midrib to near the apex branching outwards and one or two smaller pairs from above the middle of the midrib, all distinct on both surfaces; length 2 to 4.5 in.; breadth 1.25 to 2.75 in.; petioles .75 to 1.5 in., those of the branches smaller. *Heads* about .5 in. in diam., solitary on a short peduncle .75 in. or less in length, or 2 to 4 on peduncles two or three times as long. *Involucral* bracts in two rows, oblong or ovate-lanceolate, apiculate, concave, scabrid-puberulous outside like the peduncles, often recurved. Ripe *cypselas* triquetrous, scaberulous, the apex with some hairs and several short bristles, one longer than the others. Hook. fil. Fl. Br. Ind. III. 306. *W. scandens*, Benth.; Prain Bengal Plants, 612; Clarke Comp. Ind. 136 (*excl. syn.*). *Woolastonia*



*biflora* and *W. scabriuscula*, DC. Prod. V. 546, 547. *W. biflora*, Wight Ic. 1108. *Verbesina biflora*, Linn. Sp. Pl. Ed. II. 1272. Wall. Cat. 3207 (in part). *V. dichotoma*, Wall. Cat. 3024 (in part). *Eclipta scabriuscula*, Wall. Cat. 3212 (partly). *Acmella biflora*, Spreng. Syst. III. 591.

On the sea coast, common.

#### 17. SPILANTHES, Linn.

Annual herbs. *Leaves* opposite. *Heads* axillary or terminal, usually on long peduncles, heterogamous and rayed, or homogamous and disciform. *Ray-florets* ♀, in a single series, fertile, ligulate, white or yellow. *Disk-florets* ♂, fertile, tubular, with 4- or 5-fid limb. *Involucre* ovoid or campanulate, the bracts sub-2-seriate; receptacle convex, elongate, the pales enclosing the flowers often connate with the ovary into a stalk. *Anthers* with truncate entire or bifid bases. *Style-arms* of ♂ florets truncate. *Cypselas* of ray-florets triquetrous or dorsally compressed, the margins and angles usually ciliate; pappus none or of 2 or 3 bristles.—DISTRIB. About 40 species, chiefly tropical American.

SPILANTHES ACMELLA, Murr. Syst. ed. XIII. 610. Erect or ascending, glabrous, branched, 1 to 2 feet long; the branches as thick as a crow-quill, striate, glabrous, pale brown when dry. *Leaves* membranous, ovate-lanceolate or elliptic, with sub-acute apex and cuneate base, the edges crenate serrate or entire; main-nerves a single pair, ascending; length .75 to 1.5 in.; petioles .1 to .3 in. long. *Heads* ovoid-conical, .35 to .5 in. long, on slender peduncles 1 to 2.5 in. long, solitary or in very lax panicles. *Involucral bracts* short, oblong, blunt or sub-acute, 3-nerved. *Ray-florets* minute. *Cypselas* sometimes marginate, scabrid or smooth; pappus of one or two bristles or absent. DC. Prod. V. 623; Prain Bengal Plants, 614; Wall. Cat. 3285; Clarke Comp. Ind. 138; Hook. fil. Fl. Br. Ind. III. 307. *S. calva*, DC. l.c. V. 625; Wight Ic. 1109. *S. pseudo-Acmella*, Linn.; DC. l.c. 625, and in Wight Contrib. 19; Wall. Cat. 3185. *S. oleracea*, Jacq. Hort. Vind. II. t. 135; Roxb. Fl. Ind. III. 410; DC. l.c. 624. *Bidens fervida* and *B. fixa*, Lamk. Dict. I. 415, 416. *Cotula conica*, Wall. Cat. 3185. *Verbesina Acmella*, Linn. Sp. Pl. 901. *V. pseudo-Acmella*, Linn. l.c. 901.

MALACCA: Griffith (K.D.) 3186; Cuming 2361. PERAK: Scortechini 1400. PENANG: Deschamps.

#### 18. SYNEDRELLA, Gaertn.

Annual branched herbs. *Leaves* opposite, petiolate, dentate. *Heads* small, axillary and terminal, heterogamous, rayed. *Involucre* ovoid or

oblong, its bracts few ; the outer one or two foliaceous, passing into the flat scarious pales of the small receptacle. *Ray-florets* few, ♀, ligulate, with short broad 2–3-toothed lamina. *Disk-florets* ♂, tubular, regular, the limb 4-toothed. *Anthers* syngenesious, their bases sub-entire. *Style-arms* of ♂ florets long, acute. *Cypselas* of ray-florets much compressed dorsally, smooth, their edges winged and with long teeth ; those of the ♀ few, narrower, compressed or trigonous often muricate ; pappus in both consisting of 2 (rarely more) bristles.—**DISTRIB.** Species 2, tropical American, 1 also Asiatic and African.

**SYNEDRELLA NODIFLORA**, Gaertn. Fruct. II. 456, t. 171, f. 7. An erect dichotomous annual with terete wiry glabrous branches thicker than a crow-quill ; all parts more or less scaberulous. *Leaves* membranous, opposite, petiolate, ovate, acute, the base cuneate, the edges serrate or crenate (sometimes obscurely so) ; main-nerves 3 or 4 pairs, the lower pair long and bold, the others short and faint ; both surfaces minutely and sparsely strigose, and greenish when dry ; length .75 to 3 in. ; breadth .3 to 1.25 in. ; petioles .1 to .4 in. often ciliate on the edges. *Heads* .25 in. in diam., axillary, solitary or in small clusters, usually sessile but sometimes on short peduncles ; inner bracts of the involucre linear-lanceolate, shining. *Cypselas* of the inner flowers muricate, with 2 unequal hispid pappus hairs longer than themselves and than the corolla ; outer cypselas shorter, broader, smooth, black ; their edges winged, deeply toothed, pale. Hook. Exot. Flora, t. 60 ; Clarke Comp. Ind. 139 ; Hook. fil. Fl. Br. Ind. III. 308 ; Prain Bengal Plants, 615. *Verbesina nodiflora*, Linn. Amoen. Acad. IV. 290.

Near cultivation, common.

#### 19. BIDENS, Linn.

Herbaceous, annual or perennial, sometimes scandent. *Leaves* opposite, entire, irregularly lobed or 1–2-pinnatisect. *Heads* small and corymbose or larger and sub-solitary, heterogamous and rayed. *Ray-florets* in one series, neuter or rarely ♀, fertile, the corolla ligulate, yellow or white, spreading, entire or somewhat toothed. *Disk-florets* ♂, fertile, tube, cylindric, limb shortly 5-fid ; occasionally homogamous from the abortion of the ray-florets. *Involucre* campanulate or sub-hemispheric, its bracts in two series, often slightly connate below ; the outer short herbaceous or long and leafy, the inner membranous ; receptacle flat or convex ; its pales narrow, little concave. *Anthers* entire or bluntly sagittate at the base. *Style* of ♂ florets with arms hirsute upwards and short acute or long apices. *Cypselas* dorsally compressed or somewhat tetragonous, linear or cuneiform, often narrowed but not beaked above ; pappus of 2 to 4 persistent,

retroscissely barbellate arms.—DISTRIB. About 120 species, chiefly American.

*BIDENS PILOSA*, Linn. Sp. Pl. 832. An erect, very variable, glabrous pubescent or pilose herb, 6 to 24 in. high; stems when dry 4-angled. *Leaves* 3-fid to 3-partite, or 2-3-pinnatifid, their segments broadly or narrowly ovate to lanceolate, serrate. *Heads* .3 to .4 in. across, on long stout petioles of varying length, terminal or axillary. *Ray-flowers* when present white or yellow, often absent. *Involucral bracts* shorter than the flowers, broadly oblong, with scarious margins. *Cypselas* black, compressed, long, narrow, slender, ribbed; pappus of 3 or 4 bristles shorter than the cypselas, pale brown.

VAR. 1 *pilosa* proper, Hook. fil. Fl. Br. Ind. III. 309; leaves 3-fid or 3-sect, their segments broadly or narrowly ovate or lanceolate, serrate. *B. pilosa*, Linn.; DC. Prod. V. 597; Clarke Comp. Ind. 140; Prain Bengal Plants, 616. *B. leucantha*, Willd. *B. chinensis*, Willd.; Wall. Cat. 3189 (*in part*). *B. tripartita* and *B. bipinnata*, Wall. Cat. 3187 (*in part*).

VAR. 2 *bipinnata*, Hook. fil. l.c. 309; leaves bipinnately compound, their segments ovate lanceolate or linear, entire lobed or toothed. *B. bipinnata*, Linn.; Roxb. Fl. Ind. III. 411. *B. chinensis*, Wall. Cat. 3189 (*in part*). *B. Wallichii*, DC. Prod. V. 598.

VAR. 3 *decomposita*, Hook. fil. l.c. 310; leaves decompositly pinnatifid, segments linear, slender. *B. decomposita*, Wall. in DC. Prod. V. 602, Cat. 3188; Clarke Comp. Ind. 141 *excl. var. β*.

In all the provinces: in waste ground near cultivation, but not common.—DISTRIB. In all warm countries.

## 20. TRIDAX, Linn.

A perennial herb. *Leaves* opposite, pinnatisect, with few narrow segments. *Heads* solitary on very long peduncles, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate or bilabiate, the outer lip large 3-fid, the inner small and 2-fid or none. *Disk-florets* ♂, fertile, tubular, the limb elongate and 5-fid. *Involucral bracts* in few series, the outer short broad herbaceous; receptacle flat or convex; its scales membranous. *Anthers* with short acute auricles at their bases. *Style-arms* of the ♂ flowers hairy above, their apices subulate. *Cypselas* oblong or depressed-globose, silky; pappus of unequal aristate feathery bristles.—DISTRIB. 7 species, tropical American, 1 being an introduced weed in the tropics of Asia.

*TRIDAX PROCUMBENS*, Linn. Sp. Pl. 900. Procumbent, hirsute, with slightly branched stems as thick as a crow-quill. *Leaves* membranous, few, ovate-lanceolate, deeply and irregularly serrate, .5 to 2 in. long.

*Heads* .4 to .6 in. in diam., on slender erect solitary peduncles 3 to 8 in. long. *Cypselas* brown; pappus shining, white. DC. Prod. V. 679; Wall. Cat. 3197; Clarke Comp. Ind. 142; Hook. fil. Fl. Br. Ind. III. 311; Prain Bengal Plants, 618.

In cultivated and waste places: an introduction.

## 21. CENTIPEDA, Lour.

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, axillary, sessile or racemose, heterogamous, disciform, yellow. *Outer florets* ♀, in many rows, fertile, their corollas minute, obscurely lobed. *Disk-florets* ♂, few, fertile, their corollas with short tube and campanulate 4-fid limb. *Involucre* hemispheric, its bracts in 2 series, spreading in fruit; receptacle naked. *Anthers* obtuse and entire at the base. *Style-arms* of ♂ flower short, truncate. *Cypselas* 4-angled, the apices obtuse, the angles hairy; the hairs sometimes hooked; pappus none.—DISTRIB. 43 species, Asiatic, Australian, and South American.

CENTIPEDA ORBICULARIS, Lour. Fl. Cochinch. III. 493. An annual prostrate herb with numerous thin rooting stems, glabrous or sparsely tomentose. *Leaves* obovate-oblong or cuneate, .2 to .5 in. long, sparsely toothed. *Heads* .1 to .15 in. in diam., globose, solitary, axillary, subsessile. *Florets*, ♀ minute, numerous, tubular, minutely 3-toothed; ♂ 10 to 12, 4-toothed. *Cypselas* with simple hairs. Hook. fil. Fl. Br. Ind. III. 317; Prain Bengal Plants, 620. *C. minuta*, Benth. in Bth. & Hook. fil. Gen. Pl. II. 230; Clarke Comp. Ind. 151. *Myriogyne minuta*, Less.; DC. Prod. VI. 139. *Cotula sternutatoria*, Wall. Cat. 3259. *C. minima*, Willd. Sp. Pl. III. 2170. *Dichrocephala Schmidii*, Wight Ic. 1610. *Artemisia sternutatoria*, Roxb. Fl. Ind. III. 423. *A. minima*, Linn. Sp. Pl. 849. *Sphæromorphæa centipeda*, DC. l.c. 140.

In all the provinces: by the sides of roads in cultivated ground, not common.

## 22. ARTEMISIA, Linn.

Herbs or shrubs, usually fragrant. *Leaves* alternate, 1- to 3-pinna-tisect, serrate or entire. *Heads* small, numerous, racemose or paniced, solitary or in fascicles (never corymbose), heterogamous or homogamous, disciform. *Outer florets* ♀, in a single series, fertile, very slender, 2- to 3-toothed. *Disk-florets* ♂, fertile or sterile, the limb 5-fid. *Involucre* ovoid, sub-globose or hemispheric; bracts in few series, the outer shorter, their margins scarious; receptacle flat or convex, naked or hairy. *Anthers* with entire obtuse bases. *Style-arms* of the ♂ florets with truncate, usually penicillate, tips. *Cypselas* very minute, oblong,

ellipsoid or sub-obovoid, faintly striate; pappus none.—DISTRIB. About 240 species in the north temperate regions mostly of the Old World.

ARTEMISIA VULGARIS, Linn. Sp. Pl. 848. A small shrub; stems as thick as a goose-quill, brown when dry, sub-glaucous and with sparse white pubescence. *Leaves* membranous, varying much in shape and size, those near the base several inches long, large pinnatifid or bi-pinnatifid, the pinnules oblong, the ultimate lobes entire with sub-aristate apices, leaves of the stem diminishing in size upwards, lacinate, and passing near the apex into simple linear bracts less than .5 in. long; all glabrous on the upper surface and white adpressed-pubescent on the lower. *Heads* about .15 in. long, cylindric or narrowly campanulate, sessile, solitary or in small clusters, in axillary sub-second spikes of varying length, the upper part of the stem forming a long spike. *Involucral bracts* only 5 or 6, broadly lanceolate or oblanceolate, the inner scarious. *Corollas* glabrous. DC. Prod. V. 112; Boiss. Fl. Orient. III. 371; Roxb. Fl. Ind. III. 420; Clarke Comp. Ind. 161; Hook. fil. Fl. Br. Ind. III. 325. *A. indica*, Willd.; DC. l.c. 114; Roxb. Fl. Ind. III. 419; Wight Ic. 1112; Wall. Cat. 3293. *A. dubia*, Wall. Cat. 3307; DC. l.c. 110. *A. myriantha*, Wall. Cat. 3297; DC. l.c. 112. *A. paniculata*, Roxb. Fl. Ind. III. 418. *A. leptostachya*, DC. l.c. 113. *A. grata*, Wall. Cat. 3294 (*in part*); DC. l.c. 114. *A. lavandulæfolia*, DC. l.c. 110.

In all the provinces, near cultivation, not common and probably introduced.—DISTRIB. Europe, Northern Asia, India, mountains of the Malayan Archipelago.

### 23. CREPIS, Linn.

Annual or perennial herbs, glabrous or hairy, hairs all simple. *Leaves* alternate, radical or cauline, the latter often stem-clasping, entire toothed or pinnatifid. *Heads* pedunculate, solitary, fasciculate or corymbose, yellow or red, homogamous, ligulate. *Involucre* cylindric or campanulate; bracts either multi-seriate and regularly imbricate, or the outer smaller and shorter than the single series of inner; base of midrib often thickened after flowering; receptacle flat, rarely concave, naked or shortly fimbriate. *Corollas* ligulate, with broad 5-toothed apices. *Anthers* syngenesious, their bases sagittate, the auricles acute or shortly setaceous. *Cypselas* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10- to 20-ribbed, the apex narrowed or beaked; pappus usually copious, short or long, the hairs simple, soft, usually silvery, rarely brownish and stiff or brittle.—DISTRIB. Species about 10, chiefly in the northern regions of the Old World.

CREPIS JAPONICA, Benth. Fl. Hongk., 194. Annual; glabrous or puberulous; stems one or more from the same root, 6 to 18 in. high. Radical leaves oblanceolate, runcinate-pinnatifid or sinuately toothed, 1 to 2·5 in. long, usually on petioles ·5 to 1·5 in. long; cauline leaves few, much smaller and often sessile. Heads ·2 in. long and ·3 in. in diam. when expanded, on short, slender pedicels with linear minute bracteoles at their bases, collected at the apices of the long, slender stems in compact or lax corymbose cymes. Involucres shorter than the florets, their bracts in two rows, the outer very short; the inner 6 or 7, narrowly oblong, blunt, with narrow hyaline margins and dark, thickened midribs. Cypselas ·1 in. long, contracted below the apex, but not beaked, compressed, with many smooth or puberulous ribs, equal to or shorter than the soft, white pappus. Hook. fil. Fl. Br. Ind. III. 395; Prain Bengal Plants, 627. *C. lyrata*, Clarke Comp. Ind. 253. *Youngia lyrata*, Cass.; Thw. Enum. Pl. Ceyl. 168. *Youngia Thunbergiana*, *runcinata*, *napifolia*, *Poosia*, *ambigua*, *fastigiata* and *striata*, DC. Prod. VII. 192, 193. *Y. napifolia*, Wight Ic. 1147. *Lactuca napifolia*, DC. in Wight Contrib. 27. *Chondrilla runcinata*, Wall. Cat. 3272. *Prenanthes Poosia* and *napifolia*, Wall. Cat. 3265, 3277. *P. japonica*, Linn. Mant. 107. *P. striata*, Blume Bijdr. 885.

In all the provinces, near or in cultivated ground.

## Order LXII. STYLIDIEÆ.

Herbaceous plants, rarely undershrubs. Leaves radical or scattered or fasciculate on the stem, more or less subverticillate, entire, often small and narrow, no stipules. Flowers in terminal racemes or thyrsoid or corymbose panicles, irregular, perfect, pedicels bracteate. Calyx-tube adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-flowered. Corolla gamopetalous, 5-lobed, 4 lobes spreading, the fifth (lip) smaller, irregular, the lobes imbricate. Stamens 2, parallel, inserted on a glandular disk surmounting the ovary; filaments connate with the style into a column; anthers sessile on the column, the cells sub-confluent. Ovary inferior, 2-celled; style entire or divided into two stigmas; ovules many in each cell, on axile placentas on the middle of the dissepiment, anatropous. Fruit a 2-celled capsule, sometimes 1-celled by the suppression of the septum, the valves cohering at the base. Seeds minute, numerous, sub-globose; albumen fleshy; testa thin; embryo minute, next the hilum.—DISTRIB. Species about 100, Australian, with a few in tropical Asia, New Zealand, and Antarctic America.

## STYLIDIUM, Sw.

Herbs, with the habit leaves and inflorescence of the Order. *Calyx*-lobes 5, bilabiate. *Corolla* irregularly 5-lobed, 4 lobes sub-erect in pairs, the fifth smaller, recurved. *Stamens* in an elongate column, often recurved or reflexed, especially when irritated. *Ovary* 2-celled, stigma entire.—DISTRIB. 85 Australian species and 3 Indian or Malayan.

STYLIDIUM TENELLUM, Swartz in Gesellsch. Nat. Berl. Mag. 1807, 51. t. 2, fig. 3, *not of Br.* A small erect herb; stem simple, leafy, glabrous, 4 to 8 in. high, dichotomous, compressed. *Leaves* scattered, alternate, oblong or oblong-obovate, lower ones broader .2 to .3 in. long, upper ones narrower, getting gradually smaller upwards and passing gradually into bracts; nerves of lower leaves 3, from the base. *Flowers* sessile, 2 to 5, alternate; bracts minute, linear. *Calyx* bilabiate, upper 3-, lower 2-lobed, lobes linear. *Corolla* irregularly 5-lobed, 4 lobes erect linear, the fifth recurved, spathulate. *Staminal column* exsert, stamens 2, anthers 2-celled, connivent. *Ovary* inferior, elongate, 2-celled, many-seeded, stigma entire. *Capsule* 2-celled, 2-valved, .5 to .7 in. long; seeds minute, papillose. DC. Prod. VII. 336; Hook. fil. and Th. in Journ. Linn. Soc. II. 8; Miq. Fl. Ind. Bat. II. 571; Kurz in Flora, 1872, 304. *S. roseum*, Kurz in Journ. As. Soc. Beng. XLV. ii. 137, XLVI. ii. 212; Clarke in Hook. f. Fl. Br. Ind. III. 420.

PENANG: Ridley 7103. PROVINCE WELLESLEY, at Butterworth: G. King. MALACCA: Swartz.—DISTRIB. Eastern Bengal and Burma, in Dacca, Chittagong and Mergui.

*S. uliginosum*, Swartz, is recorded in Fl. Br. Ind. as from "MALACCA *fide H. f. and T.*"; as we have seen no specimens, we consider it sufficient to record the fact. In Miq. Fl. Ind. Bat. it is *S. Kunthii*, Wall., that is recorded from Malacca, and it seems more likely that this is right as Griffith obtained it at Mergui.

## Order LXIII. GOODENOVIÆ.

Shrubs, undershrubs, but chiefly herbs, juice not milky. *Leaves* alternate or radical, rarely opposite, entire dentate or occasionally pinnatifid; stipules none. *Flowers* hermaphrodite, axillary or in terminal spikes, racemes or panicles, regular or irregular, bracts and bracteoles occasionally present. *Calyx* with the tube adnate to the ovary or free; lobes 5, sometimes very small, sometimes connate in a ring or obsolete. *Corolla* gamopetalous, inserted on the calyx, usually white, yellow or blue, rarely red; lobes 5, valvate, usually induplicate-winged. *Stamens* 5, alternate with the corolla-lobes, inserted on the

disk crowning the ovary; free or connate in a ring around the style; anthers 2-celled, the cells parallel, dehiscent longitudinally and intorsely. *Ovary* 1-2-celled; style simple with a cup-shaped sheath including the stigma; ovules 1 or many in each cell, erect or ascending, rarely pendulous, inserted on the dissepiment or central. *Fruit* an indehiscent drupe or a capsule with 2 or 4 valves usually dehiscent irregularly. *Seeds* albuminous; testa thin crustaceous or thick and hard; embryo erect in the axis of the fleshy albumen, the radicle inferior.—**DISTRIB.** Over 200 species, mostly Australian, a few in New Zealand, Antarctic America, the Pacific Islands, or on the coasts of tropical Asia, Africa, and the West Indies.

### 1. SCÆVOLA, Linn.

Herbs, undershrubs or shrubs. *Leaves* simple, alternate, rarely opposite, entire or toothed. *Flowers* axillary, solitary or in dichotomously branched cymes, sessile or pedicellate. *Calyx* with the tube adnate to the ovary, turbinate, ovoid or globose; limb short, annular or 5-lobed, sometimes obsolete. *Corolla* oblique, split to the base behind, lobes sub-equal or the two uppermost shorter, at length digitately patent. *Stamens* free. *Ovary* 2-celled, with solitary erect ovules in each cell, or 1-celled with 1-2 erect ovules; sheath cupular; stigma truncate or divaricately 2-lobed. *Fruit* an indehiscent drupe, exocarp thin or fleshy, endocarp hard and woody rarely crustaceous. *Seeds* solitary; embryo smooth, cotyledons sometimes broader than the inferior radicle.—**DISTRIB.** About 60 species, 2 Asiatic, 8-10 of the Pacific Islands and the coasts of Asia, 1 extending to the coasts of Africa and the West Indies, the rest Australian.

SCÆVOLA KOENIGII, Vahl Symb. III. 36 (1794). An evergreen large glabrous shrub with stout stem and branches, soft spongy pith and coarse fibrous wood. *Leaves* alternate, sessile, obovate-oblong, obtuse at apex, decurrent at base, 3 to 6 in. long, about 2 in. broad, entire or obscurely crenate, more or less fleshy when green, membranous when dry, silky pubescent on both sides or somewhat glabrous on the upper surface, tufted hairy in the axils; midrib stout, prominent, broad, main-nerves 10-12 pair, slender, arching upwards and joining near the margin, secondary nerves few slender, reticulations many, indistinct. *Flowers* white, in axillary few-flowered dichotomous pubescent cymes shorter than the leaves; bracts small, subulate, about .1 in. long; common peduncle .5 to .6 in. long; pedicels .1 to .2 in. long; bracteoles 2, similar to the bracts. *Calyx-tube* adnate to the ovary, .2 in. long, densely villous; lobes .2 to .3 in. long, linear-lanceolate or spatulate, ciliate, pubescent, enlarged in fruit. *Corolla-tube* .7 to .8 in.



long, narrow, pubescent without, villous within; lobes valvately induplicate-winged, .25 to .4 in. long, lanceolate, prominently veined, villous-hairy within. *Stamens* erect, free, inserted around the ovary-sheath, .75 in. long; filaments thin, anthers ovate, introrse, cells parallel, connective produced above with short divergent lobes. *Ovary* 2-celled, crowned with the oblong bifid stigma which is surrounded by a long-fringed sheath; ovules 1 in each cell, erect. *Fruit* a 2-celled ovate-globose succulent drupe, .3 to .5 in. in diam., depressed above, ribbed, endocarp bony. Lamk. Ill. t. 124, fig. 2; DC. Prod. VII. 505; Hook. f. and Th. in Journ. Linn. Soc. II. 8; Hook. f. Bot. Mag. t. 2732; Blume Bijdr. 730; Miq. Fl. Ind. Bat. II. 580; Kurz in Journ. As. Soc. Beng. XLVI. ii. 212, For. Fl. II. 84; Clarke in Hook. f. Fl. Br. Ind. III. 421; Trimen Fl. Ceyl. III. 54; Cooke Bomb. Flora, II. 69; Benth. Fl. Austr. IV. 86. *S. sericea*, Forst.; DC. l.c. 506; Blume Bijdr. 750; Miq. Fl. Ind. Bat. II. 581. *S. Taccada*, Roxb. Hort. Beng. 15, Fl. Ind. I. 527; DC. l.c. 505; Dalz. and Gibs. Bomb. Fl. 134; Ham. in Trans. Linn. Soc. XVII. 250; Wall. Cat. 1314; Wight Ill. t. 137. *S. Lobelia*, Ham. in Trans. Linn. Soc. XVII. 250; De Vriese Goodenov. 20-26 and in Ned. Kruidk. Arch. II. 20, *not of Linn.* *S. Plumieri*, Blume Bijdr. 730, *not of Vahl.* *S. montana*, Lab. Sert. Austr.-Caled. 41, t. 42; DC. l.c. 506. *S. velutina*, Presl in Rel. Haenck. II. 57; DC. l.c. 506. *S. Bela-Modagam*, Rœm. and Sch. Syst. V. 163; DC. l.c. 505. *S. Leschenaultii*, DC. l.c. 506. *S. macrocalyx*, De Vriese Gooden. 26, tab. 3, figs. 1-4. *S. chlorantha* and *S. Lambertiana*, De Vriese, l.c. 27, 28. *S. lativaga*, Hance in Walp. Ann. II. 1054. *Lobelia frutescens*, Linn. Fl. Zeyl. 148. *L. Taccada*, Gærtn. Fruct. I. 119, tab. 25, fig. 5. *L. Plumieri*, Burm. Fl. Ind. 186, *not of Linn.* *Cerbera Salutaris*, Lour. Fl. Cochinch. 136. *Buglossum litoreum*, Rumph. Herb. Amb. IV. 116, t. 54. "Béla-Modagam," Rheede Hort. Mal. IV. t. 59.

PENANG: Wallich 1314. MALACCA: Griffith. JOHORE: Jensen. SINGAPORE: Sir R. Schomburgk 82; G. King; G. Thomson.—DISTRIB. Sea-shores of India from Sind to Ceylon; Burma; Malay Islands and eastwards to Australia and Polynesia.

#### Order LXIV. CAMPANULACEÆ.

Herbs, undershrubs, rarely shrubs; erect or climbing; often with milky juice. *Leaves* alternate or rarely opposite, entire toothed or rarely lobed, no stipules. *Inflorescence* axillary or terminal; flowers solitary, racemose or paniculate; bracts small; bracteoles none (present in *Sphenoclea*). *Calyx-tube* adnate to the ovary, limb few- or many-

lobed or -partite, lobes usually persistent in fruit, valvate or imbricate in bud. *Corolla* gamopetalous, tubular, rotate or campanulate, superior, sometimes bilabiate; lobes as many as those of the calyx, valvate or induplicate-valvate, sometimes 1, 2, or all free to the base. *Stamens* equal in number to the corolla-lobes and alternate with them; inserted on the epigynous disk or (in *Sphenoclea*) on the corolla-tube; filaments free or connate in a tube; anthers linear, oblong or ovate, free or connate in a tube, 2-celled, the cells parallel, dehiscing longitudinally and introrsely. *Ovary* usually inferior, 2-5- rarely more-celled; placentas axile, many ovuled; style simple, clavate, within the staminal tube; stigma-lobes as many as the ovary-cells; ovules anatropous, erect horizontal or pendulous. *Fruit* capsular or baccate, crowned by the persistent calyx-lobes, dehiscing vertically or laterally, or indehiscent. *Seeds* very many, small, albuminous; testa thin, coriaceous; embryo erect, radicle inferior.—DISTRIB. Over 1,000 species; scattered throughout the globe, chiefly in temperate regions.

Tribe I. LOBELIÆ. Corolla 2-lipped, cleft dorsally to the base; anthers connate.

Fruit a capsule, 2-valved at the summit .. .. 1. LOBELIA.

Tribe II. CAMPANULÆ. Corolla regular; anthers free or imperfectly connate.

Flowers solitary, peduncled .. ..	2. CAMPANULÆ.
Flowers in a dense scorpioid spike .. ..	3. PENTAPHRAGMA.
Flowers in a dense cylindric spike .. ..	4. SPHENOCLEA.

### 1. LOBELIA, Linn.

Herbs of various sizes, sometimes very small, sometimes erect and very tall; undershrubs or shrubs. *Leaves* alternate, usually toothed. *Inflorescence* either 1-flowered, in the axils of leaves or bracts, or in a terminal leafy raceme; bracteoles very small or none. *Calyx-tube* adnate to the ovary, turbinate, hemispheric, obovoid or rarely oblong-linear; limb 5-partite or 5-fid, lobes often unequal. *Corolla* oblique, 2-lipped; upper lip 2-, lower 3-partite or -lobed. *Staminal tube* free from the corolla or adnate only at the base; anthers with 2 lower tipped with bristles, 3 upper naked, or else all penicillate. *Ovary* inferior, 2-celled; placentas hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-tube. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—DISTRIB. About 200 species, throughout the world, though scarce in Europe and Western Asia.

LOBELIA AFFINIS, Wall. Cat. 1311. A prostrate often rooting herb with much - branched stem, pubescent or glabrate. *Leaves* ovate-

rotundate, acute at apex, rounded or truncate or cordate and more or less decurrent at base, .5 to 2 in. long, .5 to 1.5 in. broad, mucronate-dentate or -crenate, membranous, usually strigosely hairy on the nerves especially beneath, sometimes nearly glabrous; midrib slender, main-nerves 4-6 pairs; petiole .3 to .6 in. long, more or less winged by the decurrent margins of the blade, strigosely hairy. *Flowers* single, on slender pedicels about .6 to 1 in. long; bracts minute; pedicels usually deflexed in fruit. *Calyx-tube* adnate to the ovary, ribbed, strigose, obconical; lobes 5 linear spreading, .1 to .2 in. long, pilose. *Corolla* purple, .2 to .25 in. long, 2 upper lobes falcate-lanceolate, 3 lower connate, teeth short. *Staminal tube* as long as or longer than corolla, anthers all penicillate. *Ovary* 2-celled, style long, stigma bifid, lobes rounded, recurved, ovules many. *Capsule* ribbed, strigose. *Seed* small, ellipsoid trigonous. DC. Prod. VII. 360; Miq. Fl. Ind. Bat. II. 574; Hook. f. and Th. in Journ. Linn. Soc. II. 27; Clarke in Hook. f. Fl. Br. Ind. III. 424; Trimen Fl. Ceyl. III. 57; Prain Beng. Plants I. 633. *L. zeylanica*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 113; Kurz in Journ. As. Soc. Beng. XLVI. ii. 211, *not of Linn.* *L. subcuneata*, Miq. Fl. Ind. Bat. II. 574. *L. succulenta* and *L. Heyneana*, Bl. Bijdr. 728.

PENANG: Ridley 7162, 10185; J. Scott. PERAK: Ridley 2902; Curtis 2025; Scortechini 309, 344; King's Collector 2376. SINGAPORE: Kurz.—DISTRIB. Eastern Bengal, Burma, Ceylon, Malay Islands, Southern China.

*Isotoma longiflora*, Presl, is an introduced West Indian plant found in shady places. PENANG: Deschamps. SINGAPORE: Hullett 29; Kunstler 90.

## 2. CAMPANUMÆA, Blume.

Perennial erect or climbing herbs with tuberous roots. *Leaves* opposite, petiolate, usually cordate. *Flowers* usually large, solitary, peduncled, terminal or axillary on short leafless flowering branches. *Calyx-tube* adnate to the ovary, or below it, persistent, 4- to 6-partite with spreading lobes. *Corolla* broadly campanulate, the base adherent to the calyx-tube, 4- to 6-lobed; white, greenish, or lurid-purple in colour. *Stamens* 4-6, inserted round the base of the corolla-tube; filaments dilated; anthers free. *Ovary* 4-6-celled, placentas thick, many ovuled; style cylindric, stigma 4-6-cleft with short broad lobes. *Fruit* a berry, sub-globose or with truncate top, indehiscent. *Seeds* very many, small, ellipsoid.—DISTRIB. 5-6 species, all of Eastern tropical and sub-tropical and temperate Asia.

CAMPANUMÆA CELEBICA, Blume Bijdr. 727. An erect herb reaching 4 to 5 feet in height, with horizontal spreading smooth branches.

*Leaves* ovate-lanceolate, acuminate, rounded at base or cuneate, often unequal, 3 in. long, .75 to 1 in. broad, serrate or almost entire, the serratures mucronate; chartaceous; glabrous above, glaucous and glabrous or with scattered pubescence beneath; midrib slender, main-nerves 4-6 pairs at about 30 degrees with the midrib, arching and joining near the margin; petiole short, .15 to .25 in. long. *Flowers* solitary, terminal or in the forks of a dichotomous cyme; peduncles .3 to .5 in. long, those of terminal flowers shorter; bracts small linear. *Calyx-tube* in bud shortly adnate to the ovary, in fruit often half-way up; teeth .2 to .3 in. long, linear-lanceolate, often serrate. *Corolla* epigynous, shortly campanulate, white or yellowish-white, .3 to .5 in. long; lobes 5, triangular acute. *Stamens* .15 in. long; anthers linear, .05 in. long, filaments dilated. *Ovary* 5-6-celled; style thickened upwards, then cylindric, angled; stigma about 4-cleft. *Berry* .3 to .4 in. in diam., globose, white, slightly succulent, becoming nearly dry, breaking up irregularly. *Seeds* very many, minute, ovoid, flattened, testa smooth. A. DC. Monog. Camp. 120, Prod. VII. 423; Clarke in Hook. f. Fl. Br. Ind. III. 436; Prain Beng. Plants I. 634. *C. truncata*, Endl. Gen. Pl. I. 515. *Codonopsis truncata*, Wall. Cat. 1301; DC. l.c. 123; Miq. Fl. Ind. Bat. II. 566. *C. leucocarpa* and *C. celebica*, Miq. l.c. II. 565, 566. *C. albiflora*, Griff. Notul. IV. 279. *Cyclocodon lancifolium*, Kurz in Flora 303; Journ. As. Soc. Beng. XLVI. 210, partly. *C. truncatum*, Hook. f. and Th. in Journ. Linn. Soc. II. 18. *C. adnatus*, Griff.; Benth. in Gen. Pl. II. 558. *Campanula lancifolia*, Roxb. Fl. Ind. I. 505; DC l.c. 485.

PENANG: Curtis 2089. PERAK: Wray 3236; *Scortechini*.—DISTRIB. India from the Sikkim Himalaya to Chittagong and Burma, Malay Islands, Southern China.

### 3. PENTAPHRAGMA, Wall.

Fleshy perennial herbs, with short, often rooting, little-branched stems. *Leaves* alternate, broad, rounded, sometimes very unequal at the base, petioles rather long. *Inflorescence* of axillary or lateral dense bracteate scorpioid spikes or racemes, the flowers generally in pairs between the bracts. *Calyx-tube* adnate to the ovary; lobes 4-5, superior, obtuse, persistent, unequal in size. *Corolla* campanulate, the tube short, lobes 4-5. *Stamens* 5 alternate with the corolla-lobes, epigynous or on the corolla tube; anthers ovate or oblong; filaments dilated, curved outwards when open. *Ovary* 3-5-celled; style short, cylindric; stigma large, cylindric or conical, obscurely 4-5-lobed; placentas bifid, ovules many. *Fruit* a more or less succulent berry, dehiscence unknown (cf. Roxb. Fl. Ind. I. 506). *Seeds* very many,

small, ellipsoid, testa reticulate-rugose.—DISTRIB. About 7 species, all from the Malay Archipelago and Peninsula.

Leaves markedly serrate, very unequal-sided .. ... 1. *P. begoniæfolium*.

Leaves entire or only slightly dentate, nearly or quite equal-sided :—

Stem short, flower spikes from upper axils, calyx and corolla usually 5-lobed .. .. 2. *P. Scortechinii*.

Stem elongate, flower spikes from lower axils, calyx and corolla usually 4-lobed .. .. 3. *P. Ridleyi*.

1. **PENTAPHRAGMA BEGONIÆFOLIUM**, Wall. Cat. 1313. A short-stemmed fleshy herb, with flexuose rooting stems and few branches covered with crispate ferruginous woolly hairs. *Leaves* alternate, ovate, the base obliquely excised on one side, cordate on the other, shortly acuminate at apex, 6 to 10 in. long, 4 to 5 in. broad, coarsely serrate, sparsely crispate-villous; midrib thick, near the excised side, main-nerves 1 on the excised side, 4–5 on the other, the nerves again branching outwards; petiole .3 to 1 in. long, crispate-villous as are the nerves beneath. *Inflorescence* a short, 1 to 4 in. long, scorpioid, shortly peduncled spike, with 2-ranked flowers between ovate membranous bracts .25 in. long, axillary in the uppermost leaves; flowers dull yellow supported by an oblong or spatulate villous bracteole .2 in. long, .1 in. broad. *Calyx-tube* adnate to the ovary, ovoid, crispate villous; lobes 5 obtuse, rounded, recurved, shorter than the tube, crispate villous without, glabrous within. *Corolla* white, campanulate, 5-lobed, the lobes spreading and recurved, marcescent, oblong obtuse glabrous. *Stamens* 5, free, .1 to .125 in. long; anthers oblong, filaments dilated at base. *Ovary* turbinate, 3-celled; ovules many, on axile placentas; style short, stigma cylindrically peltate, obscurely 3-lobed. *Fruit* a berry, dehiscence not known; seeds very many, testa prominently reticulate. DC. Prod. VII. 495; Hook. f. and Th. in Journ. Linn. Soc. II. 26; Miq. Fl. Ind. Bat. II. 568; Kurz in Journ. As. Soc. Beng. XLVI. ii. 210; Clarke in Hook. f. Fl. Br. Ind. III. 437; Baillon Hist. des Plantes, VIII. 323, t. 152–154; Schönl. in Engl. and Pr. Nat. Pflz.—Fam. IV. 5, 60, fig. 37. *Phyteuma begoniæfolium*, Roxb. Hort. Beng. 85, Fl. Ind. I. 505; Jack in Hook. Bot. Misc. I. 276, t. 57.

PENANG: Wallich 1313; Maingay 2266 (K.D. 712); Stoliczka; Deschamps; Hullett 200; Kunstler 1598. PERAK: Scortechini 336 (part); Wray 3668. SINGAPORE: Lobb.—DISTRIB. Mergui, Griffith. A plant of the undergrowth in dense shady forests. Ridley (Trans. Linn. Soc. III.) (1893, 315) says that it “grows on rocks along the Tahan River, and also far in the woods, in rocky valleys, common.”

2. **PENTAPHRAGMA SCORTECHINII**, n. sp., King & Gamble. A

short-stemmed fleshy herb, creeping and rooting below, afterwards erect; branches flexuose, more or less crispately pilose. *Leaves* alternate, ovate or oblong-ovate, blunt or very shortly acuminate at apex, usually cuneately narrowed below and partly decurrent, sometimes slightly excised on one side; 4 to 10 in. long, 2 to 6 in. broad, entire or faintly dentate, margin often recurved, fleshy, glabrous or slightly rough above, crispately pilose and pale beneath; midrib very thick, sometimes slightly to one side, main-nerves about 4 pair, arched upwards and again branched; petiole thick, 2 to 3 in. long, crispately pilose. *Inflorescence* a short, 1 to 2 in. long, scorpioid, very shortly peduncled spike, with 2-ranked flowers between ovate obtuse bracts, axillary either singly or in pairs from the axils of upper leaves, or lateral below them; flowers white with a yellow centre, bracteole wanting. *Calyx-tube* adnate to the ovary, ovoid, villous without; lobes 5, ovate obtuse, unequal in size, .15 to .2 in. long, 3-nerved. *Corolla* campanulate, tube short; lobes 5 spreading and recurved, marcescent, glabrous. *Stamens* free, .05 to .1 long, recurved; anthers linear; filaments narrowly winged. *Ovary* turbinate, 3-celled; ovules many immersed in fleshy axile placentas; style short, stigma conical, obscurely lobed. *Fruit* a berry, apparently indehiscent; seeds very many, ellipsoid, papillose-reticulate.

PERAK: *Scortechini* 336; *Wray* 352, 389; *King's Collector* 958, 2653. PAHANG: *Ridley*. Dense forest undergrowth in the hills at 2,000–4,000 feet, in moist places.

VAR. *parvifolia*, King & Gamble, a smaller more erect plant, scarcely more than 6 in. high; much less villous, the leaves smaller, oblong, obtuse or slightly acute, 4 in. long and 2 in. broad; the inflorescence shorter and the flowers smaller.

PAHANG, at Salian River: *Ridley*. SINGAPORE, at Bukit Timah: *Ridley*.

VAR. *flocculosa*, King & Gamble, leaves ovate rotundate, thick, younger ones densely clothed beneath with crispate villous felt, margins recurved; the main-nerves rarely more than two pairs, all starting from close to the base. *Inflorescence* short, much curved, usually supported by a pair of rounded reduced leaves. *Corolla-lobes* prominently recurved. *Anthers* oblong, cells often divaricate.

PERAK: *Scortechini*. JOHORE, at Goonong Pulai, 1,800 feet: *G. King*.

This species is a very variable one, and some forms almost run into *P. begoniæ-folium*. Owing to the calyx and corolla being persistent and more or less marcescent, they vary much in size in different flowers on the same plant, and it is difficult to find characters for the varieties, one or both of which may eventually prove to be separate species.

3. *PENTAPHRAGMA RIDLEYI*, n. sp., King & Gamble. A fleshy herbaceous plant, 10 to 12 in. in height; stem .25 in. thick, smooth, at first creeping afterwards erect. *Leaves* ovate, equal-sided, bluntly acute at apex, cuneate at base, 6 to 8 in. long, 3.5 to 4.5 in. broad, glabrous on both surfaces, entire or only very minutely dentate on the margin; midrib broad, main-nerves 4-5 pairs nearly straight, slanting upwards; petiole 1 in. long. *Inflorescence* a short, 1 to 1.5 in. long, nearly sessile spike, with 2-ranked flowers between ovate-spathulate usually 3-nerved glabrous pale bracts; each flower with a .15 in. long, linear-spathulate, 1-nerved bracteole, ciliate at tip; flowers small, .2 to .25 in. long. *Calyx-tube* adnate to the ovary; lobes 4-5, equal or unequal in size, usually .1 in. long, 3-nerved, the nerves arching. *Corolla-tube* short, lobes 4-5, linear-oblong, emarginate, recurved, glabrous without, minutely pubescent within, white spotted at base with purple, nerves 3. *Stamens* adnate at base to the corolla-tube, .05 to .07 in. long, anthers club-shaped, filaments dilated below. *Ovary* turbinate, 3-celled; ovules many on axile placentas; stigma rounded, 3-5-lobed, on a very short conical style. *Fruit* a berry, conical at top, apparently indehiscent; seeds rather few and large; testa beautifully reticulate.

SINGAPORE: *Ridley* 103.—In damp ravines at Bukit Timah (Herb. Kew).

#### 4. *SPHENOCLEA*, Gaertn.

An annual erect glabrous herb, of marshy places. *Leaves* alternate, lanceolate, entire. *Flowers* in dense cylindric terminal or leaf-opposed peduncled spikes; very small, sessile, each with one bract and two bracteoles. *Calyx-tube* adnate to the ovary, turbinate or hemispherical; lobes 5, sub-foliaceous. *Corolla* campanulate, 5-lobed, valvate. *Stamens* 5, inserted on the base of the corolla; filaments shortly dilated; anthers short, free. *Ovary* semi-inferior, 2-celled; placentas axile, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* semi-inferior, depresso-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, minute, oblong. A single species.

*SPHENOCLEA ZEYLANICA*, Gaertn. *Fruct.* I. 113, t. 24, fig. 5. An erect annual herb, 1 to 2 feet high. *Leaves* alternate, lanceolate, narrowed at both ends, 2 to 3 in. long, .25 to 1 in. broad, entire, sessile or shortly petioled, smooth, midrib and main-nerves faint. *Flowers* in dense, cylindric, terminal or leaf-opposed, peduncled spikes; peduncles .5 to 1 in. long; spikes .5 to 1.5 in., bract and bracteoles very small. *Calyx-tube* adnate to the ovary, turbinate or hemispherical, lobes 5, ovate, .05 to .06 in. long, somewhat enlarged in fruit and inflexed over

the disk. *Corolla* campanulate, 5-lobed, .07 to .1 in. long, greenish-white, lobes short, rounded. *Stamens* 5, inserted at the base of the corolla-tube; filaments short dilated; anthers 2-celled, rounded, about as long as filaments. *Ovary* semi-inferior, 2-celled; placentas axile, stalked, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* depressed-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, oblong, minute, scabrous; testa reticulate with rectangular cells. Wall. Cat. 1516; Roxb. Fl. Ind. I. 507, Fl. Ind. ed. Carey and Wall. II. 116; Miq. Fl. Ind. Bat. II. 569; Kurz in Journ. As. Soc. Beng. XLVI. ii. 209; Clarke in Hook. f. Fl. Br. Ind. III. 438; Trimen Fl. Ceyl. III. 519; Baillon Hist. des Plantes, VIII. 327, t. 158-161; Cooke Bomb. Flora, II. 75; Prain Beng. Plants I. 635; Schönk. in Engl. and Pr. Pflz—Fam. IV. 5, 61, fig. 38. *S. Pongatium*, A. DC. Prod. VII. 548; Wight Ill. t. 138. *Pongatium indicum*, Lamk. Ill. II. 444; Encyc. Meth. Bot. V. 564. *Gaertnera Pangati*, Retz Obs. VI. 24. *Rapinia herbacea*, Lour. Fl. Cochinch. (ed. Willd.) I. 157. *Sphenoclea*, Griff. Notul. IV. 276. "Pongati," Rheede Hort. Mal. XI. 47, t. 24.

MALACCA: *Griffith*.—DISTRIB. Swampy places and wet fields, and along river banks in tropical regions of both hemispheres.

#### Order LXV. VACCINIACEÆ.

Shrubs or small trees, often epiphytic, with stems swollen at the base. *Leaves* alternate or in pseudo-whorls, entire dentate or serrate, evergreen, ex-stipulate. *Flowers* in terminal or axillary racemes, or solitary and axillary, hermaphrodite, usually regular; pedicels 1-bracteate and also often with 2 bracteoles, often articulate beneath the ovary. *Calyx* campanulate or cupular, the tube adherent to the ovary, its limb persistent on the fruit, usually 5-toothed. *Corolla* tubular (sometimes inflated), campanulate or globose, 5-toothed or 5-lobed, usually imbricate, deciduous. *Stamens* 10, epigynous, inserted at the base of the corolla-tube; anthers opening by apical pores, or often produced into 2 tubes, opening by slits, filaments flattened, free or connate by their bases. *Ovary* inferior, crowned by an epigynous disk, 5-celled or falsely 10-celled; style cylindric; stigma simple; ovules many (rarely few), the placentas axile or pendulous from the upper inner angle of each cell. *Fruit* baccate, rarely dry, 5- or falsely 10-celled. *Seeds* numerous or few (rarely only 1) in each cell, small, compressed, albuminous. Species about 350, natives chiefly of cold and temperate regions throughout the world.



Corolla long and tubular or campanulate, with long segments :—

Calyx-tube terete	..	..	..	1. AGAPETES.
Calyx-tube 5-winged or 5-angled	..	..	..	2. PENTAPTERYGIIUM.
Corolla small, campanulate or ovoid, its lobes short	..	..	..	3. VACCINIUM.

### 1. AGAPETES, D. Don.

Shrubs, often epiphytic, the stems often much swollen near the base. *Leaves* usually coriaceous, alternate, sometimes in pseudo-whorls, from linear to elliptic, entire or toothed, sessile or with short petioles, often glandular near the base. *Flowers* axillary, solitary, corymbose or in fascicles; the pedicel often thickened or articulate under the ovary, bracts small. *Calyx* globose, the limb with 5 persistent teeth or lobes. *Corolla* tubular or campanulate, the limb with short or long lobes, red, but often with transverse marks or with greenish-white lobes. *Stamens* 10, usually with short filaments; *anthers* oblong, each with 2 long apical processes, opening by pores or slits, often spurred behind. *Disk* pulvinate, often lobed. *Ovary* 5-celled or falsely 10-celled; style cylindric; stigma capitate; ovules numerous. *Berry* globose, nearly dry or succulent, 5- or 10-celled, sometimes opening by pores round the disk within the calyx-teeth. *Seeds* numerous, ellipsoid, testa lax.—DISTRIB. 30 species, mostly Himalayan, a few Malayan.

AGAPETES GRIFFITHII, Clarke in Hook. f. Fl. Br. Ind. III. 449. An epiphytic shrub, 3 to 15 feet long, with a tuberous stem; young branches half as thick as a goose-quill, terete, glabrous. *Leaves* thinly coriaceous, oblong-lanceolate to ovate-lanceolate, always caudate-acuminate, the base rounded, both surfaces pale olivaceous-brown when dry, glabrous, minutely reticulate; main-nerves 5 or 6 pairs, curved, ascending, faint on both surfaces; length 3·5 to 6 in.; breadth 1 in. to 2·65 in.; petiole ·15 in. long or under. *Flowers* ·3 to ·4 in. long, axillary, always on slender pedicels four or five times as long as themselves, with 1 or 2 narrow bracteoles near the base, glabrous, axillary, solitary, in pairs or in lax racemes. *Calyx* ·1 to ·2 in. long (enlarging in fruit), campanulate, with 5 deep spreading triangular lobes. *Corolla* ·25 in. long, tubular-campanulate, the mouth with 5 triangular sub-erect acute lobes. *Anthers* inserted at the base of the corolla-tube, linear, with 2 long apical beaks dehiscing longitudinally, and 2 posteriorly-projecting curved spurs; filaments shorter than the anthers, hairy. *Fruit* globular, glabrous, crowned by the small inflexed calyx-lobes. *Seeds* about 20, compressed, tubercled, black.

MALACCA: *Griffith*. PERAK: at elevations of 2,800 to 4,000 feet, *Wray* 1071; *King's Collector* 3831, 6363, 8051; *Ridley* 5532; *Scortechini*.

## 2. PENTAPTERYGIUM, Klotsch.

Shrubs, often epiphytic and with stems much thickened at the base. *Leaves* alternate, ovate or lanceolate, sub-entire or toothed, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, solitary, fascicled or corymbose; the pedicels thickened near the apex, cupular and jointed under the ovary, bracts small. *Calyx-tube* large, tubular, with 5 wings or prominent angles; its lobes 5, enlarged in fruit. *Corolla* tubular, the mouth with 5 short lobes, coloured red or yellow, and often transversely marked. *Stamens* 10, epigynous, the filaments short; anthers elliptic, produced into 2 long beaks, opening by apical pores or slits, and often spurred behind. *Ovary* 5-celled or spuriously 10-celled; style cylindric, often exserted; stigma sub-capitate; ovules very numerous. *Fruit* baccate, 5-winged or 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* numerous, ellipsoid. —DISTRIB. About 6 species, natives of Eastern Himalaya, Khasia, Malay Peninsula.

PENTAPTERYGIUM SCORTECHINII, n. sp., King & Gamble. A sarmentose shrub, 4 to 10 feet long, growing on rocks or trees; young branches somewhat thinner than a goose-quill, terete, glabrous, pale brown when dry. *Leaves* thickly coriaceous, ovate to ovate-rotund, the apex blunt or sub-acute, the base broad and rounded but sometimes slightly emarginate, the edges much recurved when dry; upper surface shining, glabrous, pale olivaceous-brown; the lower darker; midrib strong, deeply depressed on the upper surface, prominent on the lower; main-nerves about 4 pairs, spreading, the two lower much the larger, all curved, mostly depressed on the upper surface and prominent on the lower; length 1·75 to 3 in.; breadth ·8 to 2 in.; petioles ·25 to 4 in. *Flowers* 1 in. long, few together, in axillary or terminal corymbs; their pedicels about ·6 in. long, with 1 or more linear bracts at the base. *Calyx* inflated, tubular, narrowed towards the mouth, glabrous, lobes of the mouth triangular, acute, erect, the lower half of the tube attached to the ovary. *Corolla* inserted on the concave disk of the ovary, slightly exserted from the calyx, tubular, inflated towards the middle; lobes of the mouth short, lanceolate, reflexed; tube with rufous pubescence outside, glabrous within; style cylindric, glabrous, slightly exserted. *Fruit* unknown.

PERAK, at elevations of about 4,500 feet: *King's Collector* 8152; *Wray* 210; *Scortechini* 309.

## 3. VACCINIUM, Linn.

Shrubs, sometimes epiphytic. *Leaves* usually small, alternate, but sometimes in pseudo-whorls, from lanceolate to ovate, entire or serrate.

*Flowers* usually small, axillary or terminal, in racemes fascicles or corymbs rarely solitary, usually bracteate and bracteolate. *Calyx-tube* globose, its teeth 4 or 5, small. *Corolla* urceolate, tubular or ovoid, 5-lobed, pink white or greenish-yellow. *Stamens* 8 or 10, free, inserted near the base of the corolla-tube; anthers oblong, with two apical cylindric tubes dehiscing by terminal slits, sometimes appendiculate at the base (apical tubes very short in one or two species). *Disk* cushion-shaped, convex, sometimes lobed. *Ovary* 4- or 5-celled, or falsely 8-10-celled; style cylindric; stigma simple; ovules few or several in each cell. *Fruit* a more or less globose berry, crowned by the persistent calyx-lobes, 5-celled or falsely 10-celled. *Seeds* small, 1 or more in each cell, ellipsoid, compressed; testa firm, smooth.—**DISTRIB.** Species about 140, in the Northern Hemisphere or on mountain ranges in the tropics.

Leaves broadly elliptic, ovate-rotund or oblanceolate, the apex broad, sometimes minutely apiculate but never acute, very coriaceous :—

Leaves under .75 in. in length, elliptic or obovate-elliptic; corolla .3 in. long, tapering to the mouth; a small glabrous tree or bush . . . . .

1. *V. Scortechinii*.

Leaves under 1 in. in length, ovate or elliptic; corolla .2 to .25 in. long, the mouth wide, truncate; an epiphytic shrub, glabrous except the scurfy branches . . . . .

2. *V. microphylla*.

Leaves elliptic, their apices sub-obtuse, the base truncate or minutely cordate, 1 to 1.35 in. long; flowers enveloped in large deciduous bracts . . . . .

3. *V. glabrescens*.

Leaves broadly oblanceolate or spatulate, much narrowed to the base . . . . .

4. *V. viscidifolium*.

Leaves obovate-elliptic, slightly narrowed to the apex but never acuminate, coriaceous; flowers .35 in. long, in axillary racemes . . . . .

5. *V. Teysmanni*.

Leaves elliptic to elliptic-oblong, sub-acute acute or acuminate :—

Leaves entire :—

Leaves glabrous :—

Leaves coriaceous :—

Leaves with 4 or 5 pairs of main-nerves; flowers .2 in. long, in axillary and terminal racemes: mouth of corolla entire or obscurely toothed; a shrub or small tree; anthers with short broad beaks . . . . .

6. *V. bancanum*.

Leaves with 3 pairs of main-nerves; corolla .2 in. long; its mouth with 5 short, broad, recurved lobes; beaks of anthers truncate, shorter than the cells, epiphytic . . . . .

7. *V. Kunstleri*.

Leaves sub-coriaceous, their main-nerves 3 pairs; flowers .35 in. long; beaks of anthers more than twice as long as the cells; epiphytic . . . . .

8. *V. Hasseltii*.

Leaves pubescent or puberulous beneath :—

Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, with very long caudate acuminate apices ;

under surface pubescent or puberulous .. 9. *V. acuminatissimum*.

Leaves serrate (sometimes faintly so) sub-coriaceous, glabrous ; flowers .3 in. long ; beaks of anthers twice as long as the cells .. .. 10. *V. malaccense*.

1. *VACCINIUM SCORTECHINII*, n. sp., King & Gamble. A small tree or large shrub ; young branches rather thicker than a crow-quill, dark and much angled when dry, glabrous. *Leaves* small, coriaceous, elliptic or obovate-elliptic, the apex rounded, the base slightly cuneate, the edges much recurved ; upper surface olivaceous-brown, shining when dry ; the lower brown, dull, faintly reticulate ; sparsely scaly ; main-nerves a single pair, rarely 2 pairs, curving upwards, converging at their apices, faint on both surfaces ; the midrib depressed on the upper surface, prominent on the lower ; length .3 to .45 in. ; breadth .25 to .35 in. ; petiole very short. *Flowers* about .35 in. long, solitary, axillary, their pedicels less than .1 in. long, minutely bracteate at the base, pubescent like the outside of the calyx and corolla. *Calyx* campanulate, the 5 teeth triangular, acute, erect. *Corolla* about .3 in. long, cylindric, inflated below and tapering to the mouth ; the lobes short, broad, blunt, erect or reflexed. *Stamens* 10, each with 2 apical truncate beaks shorter than themselves, but no basal processes ; filaments longer than the anthers, hairy. *Ovary* with a flat top, 5-celled, each cell with several ovules. *Style* cylindric, nearly as long as the corolla, pubescent in its lower third, otherwise glabrous. *Fruit* globular, crowned by the inflexed calyx-lobes, tomentose, many-seeded ; seeds not compressed.

PERAK : *Scortechini* ; Wray, at elevations of 6,000 and 6,700 feet, 888 and 356 ; *King's Collector* 8028.

By the fall of the leaves, in the axils of which they are produced, the flowers appear as if they were in racemes. This closely resembles *V. buxifolium* and *V. coriaceum*, Hook. fil., of which figures are given in Hook. Ic. Pl. t. 891 and 892, but this has much narrower flowers and broader leaves than either.

2. *VACCINIUM MICROPHYLLUM*, Blume Bijdr. 851. Epiphytic on tall trees ; a small much-branched shrub ; young branches as thick as a crow-quill, with small black deciduous scurf. *Leaves* coriaceous, ovate or elliptic, the apex and base blunt, the former sometimes with a minute apiculus ; upper surface bright olivaceous and shining when dry, the lower pale-brown and dull, both faintly reticulate when dry ; main-nerves usually a single pair, curving upwards from the base of the midrib and passing to near the apex a little inside the edges, depressed like the midrib on the upper surface when dry, but very faint on the lower ;

length .5 to .75 in.; breadth .3 to .5 in.; petioles about .05 in. long, hairy. *Flowers* .2 to .25 in. long, axillary, usually solitary, decurved; pedicels .05 in. long, or less. *Calyx* inferior, about .2 in. across, flat, deeply divided into 5 broadly triangular, sub-acute, spreading lobes. *Corolla* glabrous, widely cylindric-campanulate, deeply cut into 5 broadly triangular acute or sub-acute erect lobes. *Stamens* 10, from the base of the corolla; anthers oblong, each with an apical process shorter than itself but with no basal appendage; filaments shorter than the anthers, curved, expanded at the base. *Ovary* superior, broad with flat apex. *Style* cylindric, as long as the corolla; stigma capitate; ovules few in each cell. *Fruit* globular, surrounded by and adherent to the calyx, .2 in. in diam. Miq. Fl. Ind. Bat. II. 1063. *Diplycosia microphylla*, Beccari, Malesia 212; Clarke in Hook. f. Fl. Br. Ind. III. 458.

MALACCA: *Griffith* (K.D.) 3484; *Maingay* (K.D.) 700; *Lobb*. PERAK, at elevations of 3,000 feet: *Wray* 470, 1105; *Scortechini* 1171; *King's Collector* 3660, 6390. KEDAH: *Ridley* 5528, 5529.—DISTRIB. Borneo, Celebes, Ternate.

3. *VACCINIUM GLABRESCENS*, n. sp., King & Gamble. Epiphytic; young branches rather thicker than a crow-quill, dark-coloured when dry, minutely pubescent. *Leaves* coriaceous, elliptic, the apex sub-obtuse, the base sub-truncate and minutely cordate; upper surface dark olivaceous-brown when dry, reticulate, smooth, shining; lower surface brown when dry, minutely pubescent like the petiole (glabrescent when old); main-nerves 3 or 4 pairs, pinnate, ascending, rather straight; length 1 to 1.35 in.; breadth .6 to 1 in.; petiole under .1 in. long. *Racemes* solitary, terminal, 3 or 4 times longer than the leaves, bearing at the base of each flower a large lanceolate pubescent deciduous bract .4 in. long and about .2 in. broad at the middle. *Fruit* sub-rotund or ellipsoid, baccate, softly and minutely pubescent, crowned by the inflexed triangular calyx-teeth, .2 in. long and .15 in. in diam., 5-celled, each cell with several angled seeds.

PERAK: *Scortechini* (without number).

4. *VACCINIUM VISCIFOLIUM*, n. sp., King & Gamble. Young branches half as thick as a goose-quill, striate and pale-brown when dry. *Leaves* very coriaceous, broadly oblanceolate or spatulate, the apex very blunt, narrowed from below the middle to the short flattened petiole, the edges slightly recurved; upper surface olivaceous when dry, the lower bright brown, both glabrous; main-nerves 2 or 3 pairs, originating from the midrib near its base, ascending, little curved, very prominent like the midrib on the upper surface but faint on the lower; length 2 to 2.75 in.; breadth .8 to 1.25 in.; petioles about .1 in. *Racemes* terminal and axillary, often forming, from the fall of the leaves, pseudo-

panicles several times longer than the leaves. *Flowers* not seen. *Fruit* on curved deflexed peduncles, .5 in. in length, globular, baccate, .2 in. in diam., crowned by the persistent disk and by the 5 minute triangular calyx-teeth, 10-celled, the cells with more than one small angled seed.

PERAK: *Scortechini* 405; *Wray*, at an elevation of 6,700 feet, 328.

VAR. *minor*, King & Gamble. Leaves only 1.2 to 1.6 in. in length, their 3 or 4 pairs of nerves not so much from the base of the midrib; racemes not much longer than the leaves; fruit only .15 in. in diam.; pedicels under .2 in. long.

PERAK, at elevations of 5,000 feet: *Scortechini* 404; *King's Collector* 8020.

5. *VACCINIUM TEYSMANNI*, Miq. Fl. Ind. Bat. II. 1062. A medium-sized tree; young branches somewhat thinner than a goose-quill, dark-coloured and striate when dry. *Leaves* coriaceous, broadly obovate, often almost rotund-obovate or elliptic, rarely oblanceolate, the apex obtuse or rounded, rarely retuse or sub-acute, the base cuneate and merging in the broad, sometimes glandular petiole; both surfaces glabrous and faintly reticulate, upper olivaceous when dry, shining, the lower dark-brown, the midrib broad on both; main-nerves 4 to 6 pairs, curving upwards and anastomosing freely, more prominent on the upper than on the lower surface; length 2.5 to 3.5 in.; breadth 1.25 to 2.25 in.; petiole .2 to .4 in. long. *Racemes* slender, often longer than the leaves, axillary and extra-axillary, their rachises somewhat compressed and angled, often puberulous; pedicels slender, curved, minutely bracteolate or ebracteolate at the base, .15 to .2 in. long. *Flowers* .35 in. long; their pedicels .15 in. long, decurved or not, puberulous like the outside of the calyx. *Calyx* less than .1 in. long, campanulate, with 5 acutely triangular spreading teeth. *Corolla* white, puberulous, narrowly cylindric, tapering slightly to the mouth; lobes 5, very short, spreading or reflexed. *Stamens* 8 or 10, included or sub-exserted; anthers narrowly oblong, with 2 long apical spurs, but without basal appendages, shorter than the tapering hairy filaments. *Ovary* hemispheric, deeply grooved; style as long as the corolla, grooved; stigmas 5, very short, linear. *Capsule* unknown.

PERAK: On Gunong Bubu, at elevations of 4,500 feet, *Scortechini* 428, 443; *Wray* 1117, 3909; *Curtis* 3703.—DISTRIB. Java.

6. *VACCINIUM BANCANUM*, Miq. Fl. Ind. Bat. Suppl. 587. A small tree; young branches twice as thick as a crow-quill, deciduously puberulous, pale and angled when dry. *Leaves* coriaceous, elliptic to elliptic-oblong, the apex sub-acute acute or acuminate, the base

cuneate; both surfaces yellowish-brown when dry and rather dull, the lower reticulate; the edges slightly recurved or not; main-nerves 4 or 5 pairs, ascending, slightly curved, faint on both surfaces; length 1 to 2·5 in.; breadth ·5 to ·8 in.; petioles ·1 in. long. *Racemes* axillary and terminal, twice as long as the leaves, their rachises puberulous, angled when dry. *Flowers* ·2 in. long; their pedicels slender, decurved, ·1 to ·2 in. long, puberulous, minutely bracteolate at the base. *Calyx* puberulous, cupular, ·15 in. across, deeply divided into 5 triangular sub-acute spreading lobes. *Corolla* ovoid or ovoid-globulose, with truncate, wide, entire, wavy or obscurely toothed mouth, puberulous outside. *Stamens* 10, shorter than the corolla and inserted at its base; anthers short, broad, with 2 short, trumpet-shaped, curved apical processes, opening by wide pores, and, at the base of these processes behind, 2 curved, slender filamentous spurs; the filaments longer than the anthers, flattened, tapering from the base upwards, pubescent. *Ovary* depressed, bearing a slightly convex 10-grooved disk and many hairs. *Fruit* ·2 to ·25 in. in diam., depressed-globular, crowned by the inflexed calyx-lobes, minutely pubescent, 5-celled; seeds numerous, triangular, reticulate, shining. Clarke in Hook. f. Fl. Br. Ind. III. 454. *V. exaristatum*, Kurz in Journ. As. Soc. Beng., 1873, Pt. II. 96; 1877, Pt. II. 215; For. Fl. Burm. II. 91.

PERAK, at elevations of from 5,000 to 6,500 feet: *Wray* 328, 1528, 3912; *King's Collector* 7018. MALACCA: Mount Ophir, *Moxon*; *Maingay* (K.D.) 699.—DISTRIB. Bangka.

7. *VACCINIUM KUNSTLERI*, n. sp., King & Gamble. Epiphytic; everywhere glabrous; young branches one-third of the thickness of a goose-quill, dark and striate when dry. *Leaves* coriaceous, lanceolate or narrowly elliptic, the apex acuminate, the base much narrowed, the edges slightly recurved; both surfaces brown when dry, the upper tinged with olivaceous and reticulate; main-nerves 3 pairs, ascending, little curved, slightly prominent on the upper surface only; length 2 to 2·5 in.; breadth ·5 to ·65 in.; petioles ·1 to ·15 in. long. *Racemes* about as long as the leaves, axillary, minutely bracteolate at the base of the flowers. *Flowers* ·2 in. long, their puberulous pedicels slender, ·1 to ·15 in. long. *Calyx* cupular-campanulate, about ·05 in. long, the limb spreading, wavy, with indistinct broad lobes. *Corolla* tubular-ovoid, ·15 to ·2 in. long, the mouth with 5 broad, blunt, short recurved lobes. *Stamens* 10, slightly shorter than the corolla or as long; anthers small, oblong, each with 2 short, diverging, apical truncate processes, but with none at the base; filaments three times as long as the anthers, tapering, flattened and hairy below, cylindric above. *Ovary* 5-celled, with several ovules in each cell, depressed; disk slightly convex with radiating

grooves; style slightly exserted, hairy below; stigma small. *Fruit* globular, .2 in. in diam.

PERAK, on Maxwell's Hill, elevation 3,500 feet: *Scortechini* 39, 428; *King's Collector* 8415.

This closely resembles *V. bancanum*, Miq., but it is an epiphyte. Its leaves, moreover, are narrowly elliptic or lanceolate, and they have only 3 pairs of main-nerves. The flowers of this are puberulous, and the mouth of the corolla, instead of being entire, has 5 broad, short, recurved lobes. The apical processes on the anthers are also of a different shape from those in *V. bancanum*.

8. *VACCINIUM HASSELTII*, Miq. Ann. Mus. Lugd. Bat. I. 40. An erect shrub; young branches twice as thick as a crow-quill, dark-coloured and angled when dry, glabrous. *Leaves* elliptic to elliptic-oblong, thinly coriaceous, glabrous, the apex acuminate (often caudately so); upper surface olivaceous-brown, the lower paler; main-nerves 3 pairs, very slightly curved and erect or ascending, the lower pairs passing almost to the apex, faint but distinct on both surfaces, some of the nerves transverse, the others vertical; length 1.5 to 2.5 in.; breadth .6 to 1.25 in.; petioles .2 to .25 in. long, slender. *Racemes* axillary and terminal, usually slightly longer than the leaves, their rachises at first puberulous but ultimately glabrous, ebracteolate; flower-pedicels slender, curved or straight, about .15 in. long. *Calyx* shortly cupular, with 5 spreading, broad, sub-acute or blunt teeth. *Corolla* about .35 in. long, sub-cylindric, narrowing upwards to the mouth; the lobes 5, broad, blunt, erect or reflexed, very short, each bearing a small tuft of hairs. *Stamens* 10, as long as the corolla; anthers oblong, with 2 apical beaks more than twice as long as themselves but with no basal appendages; the filaments shorter than the beaks but longer than the anther-cells, broad and hairy at the base. *Ovary* much compressed, surmounted by a large, much corrugated disk; style as long as the corolla, tapering, boldly ridged. *Fruit* globular, smooth, glabrous, .3 in. in diam., crowned by the minute calyx-lobes. *V. bancanum*, Miq., var. *angustifolium*, Scheff.

PERAK: *King's Collector* 7515; *Derry* 3702; *Wray* 4012. PAHANG: *Ridley* 1363, 10895. JOHORE: *Ridley* 6316, 6323. SINGAPORE: *Ridley* 3030, 6316A, 8907.—DISTRIB. Bangka.

9. *VACCINIUM ACUMINATISSIMUM*, Miq. Ann. Mus. Lugd. Bat. I. 36. Epiphytic shrub, 3 to 8 feet long; young branches half as thick as a goose-quill or less, clothed with short cinereous pubescence. *Leaves* coriaceous, oblong-lanceolate to elliptic-lanceolate, the apex caudate-acuminate, the base cuneate, the edges when dry much recurved; both surfaces dark olivaceous-brown when dry: the upper



shining, faintly and minutely reticulate, glabrous except the puberulous midrib, lower surface dull, dark cinereous-puberulous, especially on the midrib and nerves; main-nerves 4 or 5 pairs, unequal, slightly curved, ascending, the second lowest pair much larger than the others and more erect, all (like the midrib) depressed on the upper surface and bold and prominent on the lower; length 3·5 to 5 in.; breadth 1 in. to 1·75 in.; petioles ·15 in. long, pubescent and with several short hispid axillary processes at their bases. *Racemes* axillary, shorter than the leaves, slender, pubescent; flower-pedicels ·1 in. long, pubescent like the calyx, minutely bracteate at the base. *Calyx* when nearly ripe ·15 in. in diam., with an ovoid-globular tube pubescent outside, the mouth with 5 triangular acute incurved lobes. *Corolla* not seen. *Seeds* several, compressed, black, pitted. *Ericacea*, Wall. Cat. 7528.

PERAK, at elevations of from 5,000 to 6,000 feet: *Wray* 1159, 1418, 2821; *Scortechini* 472; *King's Collector* 3509, 6734, 7810. SINGAPORE: *Ridley* 6235.—DISTRIB. Sumatra (*Beccari* 516), Java, Borneo.

10. *VACCINIUM MALACCENSE*, Wight in Calc. Journ. Nat. Hist VIII. (1847) 172. An erect shrub; all parts except the inflorescence glabrous; young branches as thick as a crow-quill, angled, brown when dry. *Leaves* coriaceous, lanceolate or elliptic, the apex acuminate, the base cuneate or acuminate, the edges finely crenate-serrate; both surfaces brown when dry, the lower the paler; main-nerves 4 or 5 pairs, slightly curved, ascending, interarching within the edge, not prominent on either surface; length 1 to 2·25 in.; breadth ·6 to ·9 in.; petioles ·1 to ·15 in. long. *Racemes* axillary and terminal, longer than the leaves, many-flowered, puberulous like the pedicels and flowers; pedicels slender, curved downwards, ·15 in. long (lengthening in fruit), each with 1 concave, lanceolate, caducous bract at its base, and 1 or 2 smaller subulate bracteoles inside it. *Flowers* ·3 in. long. *Calyx* campanulate, under ·1 in. long, its lobes narrowly triangular, acuminate, spreading. *Corolla* ovoid-cylindric, slightly narrowed to the mouth; lobes of limb very short, reflexed. *Stamens* 10, shorter than the corolla; anthers with 2 apical beaks longer than themselves but with no basal processes; filaments longer than the anthers, bulbous and hairy at the base. *Ovary* depressed, the disk thick; style cylindric, ridged, a little shorter than the corolla. *Fruit* depressed-globose, glabrous, ·35 in. broad. Wight Ic. 1186; Miq. Fl. Ind. Bat. Suppl. 587; Clarke in Hook. f. Fl. Br. Ind. III. 454. *Epigynium malaccense*, Klotzsch in Linnæa, XXIV. 50.

MALACCA: *Griffith* (K.D.) 3458/1; *Maingay* (K.D.) 698; *Lobb*. SINGAPORE: *Ridley*. PAHANG: *Ridley* 1025. PERAK: *Ridley* 3605.—DISTRIB. Bangka, Java, Cochin-China.

## Order LXVI. ERICACEÆ.

Shrubs, trees, or perennial herbs. *Leaves* alternate or in pseudo-whorls, ex-stipulate, entire or serrate. *Flowers* in racemes or fascicles or solitary; pedicels bracteate and sometimes bi-bracteolate. *Flowers* regular or (in *Rhododendron*) slightly irregular, hermaphrodite, sometimes dimorphous. *Calyx* free or (in *Diplycosia*) sometimes adnate to the ovary, with 5 rarely 4 or 6, teeth or lobes. *Corolla* hypogynous, persistent or deciduous, campanulate cylindric or urceolate, with 4 or 5 (rarely 6 to 10) imbricate or contorted, rarely valvate teeth or lobes (polypetalous in *Pyrola*). *Stamens* hypogynous or slightly attached to the base of the corolla; 10, or sometimes 5, 8, or 20 (in *Diplycosia* sometimes epigynous); filaments free or united into a tube by their bases; anthers 2-celled, basi- or dorsi-fixed, dehiscing by apical pores or slits, the cells often prolonged into apical tubes, sometimes dorsally spurred. *Disk* various, annular or convex, crenate or lobed, sometimes absent. *Ovary* 5-celled (rarely 4- to 16-celled); style slender, cylindric; stigma capitate or plane, entire or shortly lobed. *Ovules* numerous, rarely few, on placentas in the inner angles of the cells or pendulous from the upper corner. *Fruit* capsular, 5-celled, many-seeded, sometimes appearing baccate from the adherence of the enlarged succulent calyx. *Seeds* many, small, angled or compressed, albuminous; the testa often loose.—DISTRIB. About 1,200, in all parts of the world.

Fruit capsular:—

Capsule 5-valved, loculicidal:—

Calyx surrounding the capsule succulent in fruit:—

Anthers with 2 horns at the apex .. .. 1. GAULTHERIA.

Anthers not horned on the apex .. .. 2. DIPLYCOSIA.

Calyx not succulent in fruit .. .. 3. PIERIS.

Capsule 5- to 20-celled, septicidal, calyx not succulent in fruit;

anthers dehiscing by pores .. .. 4. RHODODENDRON.

Fruit baccate .. .. 5. PERNETTETOPSIS.

## 1. GAULTHERIA, Linn.

Erect or procumbent shrubs, rarely epiphytic. *Leaves* coriaceous, persistent, alternate, serrate or serrulate, penni-nerved. *Flowers* small, occasionally dimorphic, in axillary or terminal racemes, or axillary and solitary, bracteate and bi-bracteolate. *Calyx* with 5 teeth or lobes, enlarged, succulent and coloured in fruit and enclosing the capsule, and often with 2 simple or connate bracteoles at its base. *Corolla* ovoid-

tubular or campanulate, greenish-white or reddish, the mouth with 5 spreading or recurved imbricate lobes. *Stamens* 10, included, attached to the base of the corolla; anthers produced at the apex into 2 tubes, and often also with 1 or 2 dorsal spurs; filaments dilated at the base, usually pilose (in some flowers the stamens small and the anthers without appendages). *Ovary* 5-celled, sometimes 5-lobed; style cylindrical; stigma simple; ovules many in each cell. *Capsule* 5-celled, dehiscing loculicidally from the apex, enveloped in the succulent calyx; seeds many, minute, sub-globose, angled.—*DISTRIB.* Species about 80, mostly American, a few in the mountains of India and Malaya, a few also in Australia and New Zealand.

Leaves elliptic or oblong-elliptic, sub-acute	..	..	1. <i>G. fragrantissima</i> .
Leaves broadly ovate, caudate-acuminate	..	..	2. <i>G. leucocarpa</i> .

1. *GAULTHERIA FRAGRANTISSIMA*, Wall. in As. Research. XIII. 397, with figure. A shrub; young branches twice as thick as a crow-quill, 3-angled, glabrous, pale brown when dry. *Leaves* thickly coriaceous, elliptic or oblong-elliptic, sub-acute, the base cuneate, the edges crenate-serrate; both surfaces pale brown when dry and dull, strongly reticulate, the upper always glabrous, the lower with sparse black scales and occasionally a few scattered hairs; length 1·5 to 2·25 in.; breadth ·75 to 1·2 in.; petioles ·15 to ·2 in. *Racemes* axillary, usually longer than the leaves, slender, many-flowered; pedicels ·15 in. long, deflexed, each with a small triangular acute bract at its base and two broader connate ones above its middle. *Flowers* ·2 in. long. *Calyx* campanulate, with 5 deep triangular lobes, puberulous, ·05 in. long or less at first, persistent and increasing to ·2 in. with age. *Corolla* ·15 in. long, widely tubular, the mouth contracted and with 5 short blunt lobes. *Stamens* 10; anthers elongate, included, the apex with 2 deeply bifid apical horns; filaments flattened at the base. *Fruit* depressed-globular, with 5 deep grooves, ·15 in. in diam., minutely pubescent, crowned by the long, persistent, slightly clavate, cylindric style, many-seeded. DC. Prod. VII. 593; Wall. Cat. 765; Wight Ic. 1196; Bot. Mag. t. 5984; Clarke in Hook. f. Fl. Br. Ind. III. 457. *G. fragrans*, Don Prod. 151. *G. punctata*, Blume Bijdr. 850; DC. l.c. 593; Miq. Fl. Ind. Bat. II. 1055; Kurz in Journ. As. Soc. Beng., 1877, II. 215, For. Fl. Burm. II. 92. *G. ovalifolia*, Wall. Cat. 1523. *G. Leschenaultii*, DC. l.c. 593; Wight Ill. t. 141c, and Ic. 1195. *Andromeda flexuosa*, Moon Cat. Pl. Ceyl. 35. *A. katagherensis*, Hook. Ic. Pl. t. 246. *Leucothoe* (?) *katagherensis*, DC. l.c. 606.

PERAK, on the summit of Gunong Batu Pateh: Wray 879, 1580; Scortechini 405 (in part).—*DISTRIB.* British India, Ceylon, Sumatra, Java.

2. *GAULTHERIA LEUCOCARPA*, Blume Bijdr. 856. A slender climber; young branches as thick as a crow-quill, smooth, glabrous, pale-brown when dry. *Leaves* thinly coriaceous, broadly ovate, shortly rather abruptly and sharply caudate-acuminate, the base broad, emarginate or sub-cordate; edges minutely crenate-serrate; upper surface olivaceous-brown when dry, much and boldly reticulate, the nerves minutely hairy; lower surface pale-brown, reticulate, glabrous; main-nerves 2 to 4 pairs, much curved, ascending, distinct on both surfaces; length 2 to 4 in.; breadth 1 to 2 in.; petioles .15 to .2 in. long. *Racemes* slightly supra-axillary, shorter than the leaves, their rachises compressed, glabrous or pubescent; flower-pedicels rather less than .1 in. long in flower, twice as long in fruit, each with a small ovate concave bract at its base. *Flowers* .3 in. long; their pedicels rather more than .1 in. long, deflexed, puberulous, ebracteolate. *Calyx* less than .1 in. long, puberulous, campanulate, with 5 small spreading sub-acute triangular lobes. *Corolla* sub-cylindric, widest at the base and gradually tapering to the mouth, teeth of the mouth very short, blunt, erect. *Stamens* 10; anthers linear, beaked, shorter than the densely hairy tapering filaments. *Ovary* inferior, depressed-hemispheric, crowned by a thick, very concave, marginally grooved disk; style cylindric, tapering to the apex, glabrous. *Fruit* closely adnate to the calyx-tube, 5-celled, many-seeded. Miq. Fl. Ind. Bat. II. 1056; Beccari Malesia, I. 213.

PERAK, at elevations of 5,000 to 6,700 feet: *Wray* 360, 1573, 4101; *Scortechini* 1348; *King's Collector* 8025.—DISTRIB. Java, Sumatra.

## 2. *DIPLYCOSIA*, Blume.

Epiphytic shrubs, glabrous or setose, evergreen. *Leaves* coriaceous, alternate, entire or ciliate-serrate. *Flowers* small, axillary, solitary, on pedicels bracteolate at the base. *Calyx* with 5 teeth or lobes, free or half superior, accrescent in fruit, with 2 basal bracteoles connate into a calyculus. *Corolla* campanulate or urceolate, with 5 slightly imbricate recurved lobes. *Stamens* 10, as long as the corolla, and inserted at its base, quite included or with the tips of the anthers exserted; anthers elongate, oblong, produced at the apex into two straight valvularly-dehiscing tubes, but without dorsal appendages. *Disk* cupular, 10-lobed. *Ovary* 5-celled; style filiform; stigma simple; ovules in the cells numerous, attached to axile placentas. *Fruit* superior or half-superior, included in the succulent accrescent calyx, 2-celled, dehiscing by 5 valves, many-seeded. *Seeds* minute, cuneate; testa lax, reticulate; albumen fleshy; embryo axile, cylindric.—DISTRIB. Species about 14, all Indian or Malayan.

Leaves 2 to 5 in. long :—

Calyx-lobes broad, blunt .. .. .	1. <i>D. latifolia</i> .
Calyx-lobes triangular, acute .. .. .	2. <i>D. heterophylla</i> .
Leaves 1·5 to 2 in. long .. .. .	3. <i>D. erythrina</i> .

1. *DIPLYCOSIA LATIFOLIA*, Blume Bijdr. 858. A small glabrous epiphytic shrub; young branches half as thick as a goose-quill, pale and angled when dry. *Leaves* thickly coriaceous, elliptic, the apex shortly and obtusely acuminate, the base cuneate or somewhat rounded, the edges recurved; both surfaces pale yellowish-brown when dry, the upper shining, the lower dull; the midrib bold, much raised on the lower surface, slightly depressed on the upper; main-nerves 2 or 3 pairs, curving upwards, the lower pair usually longer than the others, none of them very prominent on either surface, but more so on the lower than on the upper, reticulations obsolete; length 3 to 5 in.; breadth 1·35 to 3 in.; petioles ·2 to ·3 in. long. *Flowers* ·2 in. long, in axillary fascicles of 3 or 4; their pedicels slender, ·1 to ·15 in. long, inserted 3 or 4 together on minute tubercles surrounded by several small bracts. *Calyx* cupular, ·1 in. across, with 5 broad, spreading, obtuse, ciliolate lobes. *Corolla* ·25 in. long, narrowly campanulate, contracted into a short tube at the base, the limb deeply divided into 5 ovate sub-acute lobes, closely embracing the ovary. *Stamens* 10, included; anthers narrowly oblong, each with two short apical truncate beaks but no basal processes; the filaments slender in their upper halves, the lower halves dilated and cohering into a tube. *Ovary* 5-celled, the apex broad, concave; style cylindric, about as long as the corolla; stigma small, capitate. *Fruit* 5-celled; seeds numerous, elongate, black, closely enveloped by the persistent corolla. Miq. Fl. Ind. Bat. II. 1055.

PERAK, at elevations of 6,700 feet: *Wray* 364, 909, 2204; *Scortechini* 339; *King's Collector* 6797, 8023. SELANGOR: *Ridley* 7556.—  
DISTRIB. Java.

2. *DIPLYCOSIA HETEROPHYLLA*, Blume Bijdr. 858. A shrub; young branches as thick as a crow-quill, coarsely rusty-pilose at first, afterwards sub-glabrous, when dry pale and angled. *Leaves* coriaceous, elliptic oblong-elliptic or lanceolate, acute or acuminate at apex and base, the edges recurved; both surfaces olivaceous-brown when dry, the upper sub-reticulate and shining, the lower dull and not reticulate; main-nerves 1 pair following the edge from base to apex, distinct and depressed like the midrib on the upper surface, indistinct on the lower; length 2 to 4 in.; breadth 1 to 2 in.; petiole rather more than ·2 in. long. *Flowers* axillary, fascicled, rarely solitary, about ·15 in. long, bearing under the calyx 2 broadly reniform, acute, spreading concave bracts.

*Calyx* campanulate, with 5 broadly triangular erect lobes, closely applied to the fruit. *Corolla* widely campanulate, .2 in. long, the teeth 5, broad, blunt, short, reflexed. *Fruit* superior, sub-rotund, smooth, many-seeded, crowned by the fluted style; seeds oblong, concave, compressed, numerous.

PERAK: *Scortechini*.

3. *DIPLYCOSIA ERYTHRINA*, King & Gamble. A small tree, 10 to 20 feet high; young branches twice as thick as a crow-quill, glabrous, pale-brown when dry, angled. *Leaves* thickly coriaceous, elliptic, the apex obtuse or sub-acute, the base acute, the edges recurved; both surfaces when dry pale-brown, the upper tinged with olivaceous, not reticulate, quite glabrous; main-nerves 2 to 3 pairs, ascending, rather straight, faint on both surfaces; length 1.5 to 2 in.; breadth .75 to 1 in.; petioles .1 in. long, stout. *Racemes* terminal, nearly twice as long as the leaves, with a large narrowly elliptic leaf-like bract .4 to .6 in. long, and .1 to .2 in. broad at the base of each flower-pedicel; pedicels decurved, .15 in. long in the flower, rather more than twice as long in the fruit. *Flowers* .4 in. long. *Calyx* .2 in. long, campanulate, with 5 spreading triangular acute lobes. *Corolla* .35 in. long, cylindric, narrowed towards the throat, glabrous; the mouth with 5 short, broad, blunt, recurved lobes. *Stamens* 10, slightly exserted; anthers broadly oblong, with neither apical nor basal appendages; the filaments three times as long, broadening towards the base, pubescent. *Ovary* inferior, its disk convex, hairy; style slightly exceeding the corolla, cylindric; stigma small, capitate. *Fruit* oblong-globose, .2 in. in diam., surmounted by the inflexed calyx-lobes, sub-glabrous, pericarp leathery; cells 5, each with several angular seeds. *Vaccinium erythrinum*, Hook. Bot. Mag. t. 4688.

PERAK, at elevations of 5,000 feet: *Wray* 3816; *King's Collector* 7349; *Scortechini*.—DISTRIB. Java, Sumatra.

### 3. *PIERIS*, D. Don.

Trees or shrubs, with terete branchlets. *Leaves* alternate, petiolate, entire or serrulate, persistent. *Racemes* axillary and solitary, or terminal and in panicles; pedicels bracteate and also with 1 or 2 bracteoles. *Calyx* free, with 5 teeth or lobes; the segments in bud open or valvate. *Corolla* ovoid or elongate-urceolate, with 5 short recurved teeth, white. *Stamens* 10; anther-cells ovoid-truncate; filaments each with 2 divaricate horns from its apex or ex-appendiculate. *Ovary* globose with a lobed disk, 5-celled; ovules numerous; style cylindric; stigma capitellate or truncate. *Capsule* globose, dry, 5-celled, with 5-valved loculicidal dehiscence. *Seeds* many, linear-oblong, falcate, not

winged, albuminous; testa loose.—DISTRIB. Species 10; Himalaya and the mountains of Burma and of the Malayan Peninsula.

*PIERIS OVALIFOLIA*, D. Don in Edinb. Phil. Journ. XVII. (1834) 159. A tree; young branches whitish-puberulous at first, afterwards black and glabrous, about a third as thick as a goose-quill. *Leaves* thinly coriaceous, ovate, shortly acuminate, the base broad and rounded, the edges very slightly recurved; upper surface blackish-brown when dry, glabrous, the lower of a paler brown, minutely reticulate, puberulous on the midrib and nerves; main-nerves 12 to 15 pairs, spreading, curving slightly upwards, sharply prominent on the lower surface, indistinct on the upper; length 4 to 5.25 in.; breadth 2 to 2.75 in.; petiole .25 to .3 in. long, puberulous. *Racemes* simple, axillary, 4 to 10 in. long, sometimes by suppression of the leaves forming a terminal false panicle, more or less pubescent; bracts .2 in. long, linear or lanceolate. *Calyx-teeth* connate at the base. *Corolla* narrowly ovoid, white. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* small, linear-oblong. DC. Prod. VII. 599; Loudon, Arb. Brit. 570, fig. 1070; Clarke in Hook. f. Fl. Br. Ind. III. 460. *Andromeda ovalifolia*, Wall. Cat. 763, and in Asiat. Research, XIII. 391 (*with fig.*); Don Prod. 148; Wight Ic. t. 1199; Brandis For. Flora, 280; Kurz in Journ. As. Soc. Beng., 1877, Pt. II. 216, For. Fl. Burm. II. 192. *A. elliptica*, Sieb. & Zucc. Fl. Jap. Fam. Nat. II. 126. *Thibaudia*, Griff. Ic. Pl. Asiat. t. 514.

PERAK, at an elevation of 5,000 feet: Wray 1522.—DISTRIB. Himalaya up to 8,000 ft.; Khasia Hills; Burma; Japan.

#### 4. RHODODENDRON, Linn.

Shrubs or trees, often aromatic often scaly. *Leaves* coriaceous, entire, alternate, rarely sub-opposite or in false whorls, often clustered near the ends of the branches. *Flowers* in terminal fascicles or pseudocorymbs, rarely solitary or axillary; bracts broad, usually caducous, bracteoles linear. *Calyx* persistent, 5-lobed, rarely cupular, sometimes small or obsolete. *Corolla* campanulate, salver-shaped or funnel-shaped, the tube long or short, the limb 5- to 10-lobed. *Stamens* usually 10 but sometimes 5 or 18; anthers oblong, dehiscing by terminal pores. *Ovary* 5- to 20-celled; style long or short, filiform; stigma capitate; ovules numerous in each cell. *Capsule* short or elongate, always woody, 5- to 20-celled, septicidally dehiscent, the valves separating from the placentas from above downwards. *Seeds* numerous, ellipsoid, albuminous, the testa often crested or tailed at one end or at both.—DISTRIB. Species about 160, in mountainous parts of Europe, Asia, and North America.

Corolla widely campanulate, tubular only at the base :—

All parts glabrous, leaves not glaucous and without scales ;  
capsule 1 to 1·5 in. long .. .. 1. *R. javanicum*.

Lower surfaces of leaves glaucous, the nerves and reticula-  
tions hairy ; capsule ·5 in. long .. .. 2. *R. Wrayi*.

Corolla narrowly campanulate or funnel-shaped, the tube  
inflated upwards and passing gradually into the limb ; flowers  
·35 to ·85 in. long :—

Leaves obovate, ·6 to ·8 in., and rarely as much as 1 in. long :—

All parts glabrous except the inflorescence .. .. 3. *R. pauciflorum*.

All parts more or less scaly .. .. 4. *R. perakense*.

Leaves elliptic to elliptic-rotund, from 1·25 to 2 in. long .. 5. *R. Scortechinii*.

Corolla salver-shaped, the tube much longer than the limb :—

Tube of corolla from 1·25 to 1·6 in. long, and about ·15 in. in  
diam. from base to apex ; leaves sub-sessile, whorled, sparsely  
scaly or glabrous .. .. 6. *R. jasminiflorum*.

Tube of corolla 2 in. long, ·25 in. wide near the base, widen-  
ing to ·4 in. or more near the mouth ; petioles ·35 to ·5 in. long 7. *R. longiflorum*.

Tube of corolla ·6 in. long and about ·2 in. in diam. ; petioles  
·4 to ·6 in. long .. .. 8. *R. malayanum*.

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Species imperfectly known .. .. 9. *R. dubium*.

1. RHODODENDRON JAVANICUM, Benn. Pl. Jav. Rar. p. 85, t. 19. An epiphytic shrub, 3 to 8 feet long ; all parts glabrous, esquamose ; young branches rather thinner than a goose-quill. *Leaves* thinly coriaceous, elliptic or elliptic-oblong, tapering to the acute apex and base ; both surfaces brown when dry (the lower rather the lighter), shining, the midrib very prominent ; main-nerves about 8 or 10 pairs, interarching rather far from the edge, faint on the upper surface, obsolete on the lower, the intermediate nerves almost as prominent ; length 3·5 to 5·5 in. ; breadth 1·25 to 2 in. ; petioles ·3 to ·75 in. long. *Umbels* terminal, 5- to 7-flowered, enveloped in bud in broadly ovate apiculate bracts ; pedicels ·5 to 1·5 in. ; bracteoles linear. *Calyx* cupular, less than ·1 in. deep, the mouth wavy. *Corolla* red, widely campanulate, 1·25 to 1·5 in. long ; the tube widely funnel-shaped, cylindric at the base ; the limb 1·25 to 1·5 in. wide, with 5 large, broad, blunt spreading lobes. *Stamens* 10, shorter than the corolla-limb ; the filaments slender ; the anthers oblong. *Ovary* glabrous or slightly scaly (hairy in var. *Teysmannii*) ; style shorter than the stamens, clavate, hemispheric. *Capsule* narrowly cylindric, 1 to 1·5 in. long, and only ·25 in. in diam., glabrous, slightly ridged, crowned by the whole or part of the style. DC. Prod. VII. 721 ; Bot. Mag. t. 4366 ; Fl. des Serres (1847), t. 293 ; Miq. Fl. Ind. Bat. II. 1057 ; Miq. in Ann. Mus. Lugd. Bat. I. 42, t. 1b ; Clarke in Hook. f. Fl. Br. Ind. III. 463. *Vireya javanica*, Blume Bijdr. II. 854.

MALAY PENINSULA : *Lobb* and others. PENANG : *Ridley* 129.



KEDAH: *Derry* 5531. PERAK: *Scortechini* 373, 1325; *Derry* 3705; *Fox* 129; *King's Collector* 2335, 3672, 6916, 7008; *Wray* 1023. SINGAPORE: *Ridley*.—DISTRIB. Sumatra, Java, Celebes.

VAR. *Teysmanni*, King & Gamble. Ovary densely hairy; filaments hairy near the base, corolla yellow. *R. Teysmanni*, Miq. Fl. Ind. Bat. Suppl. 585; Clarke in Hook. f. Fl. Br. Ind. III. 463.

PENANG: *Maingay* (K.D.) 1099, 10257; *Curtis* 530. PERAK: *Wray* 601, 623; *King's Collector* 3672.—DISTRIB. Sumatra, Java.

2. RHODODENDRON WRAYI, n. sp., King & Gamble. A bush; young branches as thick as a goose-quill, at first sparsely scaly, ultimately glabrous. Leaves very coriaceous, elliptic or sub-obovate-elliptic, the apex sub-acute, the base rounded, the edges recurved when dry; upper surface dark-brown when dry, glabrous, the midrib much depressed; lower surface white, glaucous, with short hairs on the minute reticulations, the main-nerves, and the bold midrib; main-nerves 6 to 12 pairs, spreading, curved, rather dark-coloured and conspicuous on the lower surface, invisible on the upper; length 1·75 to 3·5 in.; breadth ·85 to 1·5 in.; petioles ·4 to ·8 in. long, stout, scaly. Umbels terminal, 8- to 12-flowered, unequal, ·5 to ·75 in. long, scaly. Flower-buds enveloped in obovate-oblong apiculate bracts, the inner tomentose externally, the outer glabrous, all deciduous. Calyx cupular, 5-toothed, less than ·1 in. deep. Corolla glabrous, white, tinged with pale pink and spotted in the throat, widely campanulate from a tubular base, about 1·25 in. long, and rather more in breadth at the mouth; lobes of the limb 5, broadly ovate, spreading. Stamens 10; filaments shorter than the corolla, glabrous; anthers oblong. Ovary hairy; style glabrous, longer than the stamens; stigma hemispheric, lobed. Capsule only ·5 in. long and about half as much in diam., not apiculate, tomentose, ridged, 5-celled.

PERAK, at from 3,500 to 7,000 feet: *Wray* 322, 886, 1569; *Scortechini*.

3. RHODODENDRON PAUCIFLORUM, n. sp., King & Gamble. A small shrub, all parts except the inflorescence glabrous; young branches as thick as a crow-quill, smooth. Leaves coriaceous, obovate, rarely rotund-obovate, the apex broad, usually minutely retuse, the base much narrowed, the edges recurved; upper surface olivaceous, the lower brown when dry; the midrib stout and prominent on the lower surface, depressed on the upper (when dry); main-nerves 3 or 4 pairs, indistinct on both surfaces; length ·6 to 1 in.; breadth ·4 to ·65 in.; petioles less than ·1 in. long. Flowers 1 or 2, terminal; their pedicels pubescent, ·25 to ·6 in. long, with 1 or 2 loose sheathing deciduous bracts at their bases. Calyx cupular, about ·1 in. long, obscurely toothed. Corolla

bright red, infundibuliform-campanulate, .2 to .3 in. wide at the throat and from .5 to .85 in. long; the limb spreading, .5 to .75 in. across, divided into 5, broad, blunt lobes, the tube .35 to .5 in. long. *Capsule* unknown.

PERAK, on Gunong Batu Pateh at an elevation of 4,500 feet: *Wray* 231; *Scortechini* 345B.

4. *RHODODENDRON PERAKENSE*, n. sp., King & Gamble. Epiphytic; a small shrub with very scaly young branches as thick as a crow-quill. *Leaves* very coriaceous, obovate or broadly oblanceolate, obtuse, much narrowed to the base, the edges recurved; upper surface olivaceous when dry, at first with a few large scales but ultimately glabrous, reticulate, the midrib depressed; lower surface dark brown, with persistent large dark scales in pits, the midrib very thick and prominent; main-nerves 2 (rarely 3) pairs, spreading, very prominent on the under surface, and, like the midrib, with persistent large dark scales; length .6 to .8 in.; breadth .3 to .4 in.; petioles about .1 in. long. *Umbels* terminal, 3- to 5-flowered, covered in bud by broad rounded deciduous bracts with ciliate edges; pedicels .25 to .3 in. long, slightly scaly. *Flowers* .35 to .4 in. long. *Calyx* shallow, cupular, its edges wavy. *Corolla* bright yellow, narrowly campanulate, the mouth with broad, slightly spreading lobes. *Stamens* not exserted; filaments glabrous, anthers short. *Ovary* sub-glabrous; style not exserted; stigma clavate, truncate. *Capsule* .3 in. long, dehiscing by 5 straight untwisted valves.

PERAK, at an elevation of 7,000 feet: *Wray* 1574.

5. *RHODODENDRON SCORTECHINII*, n. sp., King & Gamble. Shrubby, epiphytic or terrestrial, when the latter sometimes sub-arboreous; young branches half as thick as a goose-quill, smooth, terete. *Leaves* very coriaceous, elliptic to elliptic-rotund or obovate, the apex obtuse and sometimes faintly notched, the base cuneate, the edges recurved; upper surface dark olivaceous-brown when dry, glabrous, shining, depressed-reticulate; lower surface of a uniform warm brown, not reticulate, pitted and minutely scaly; main-nerves 4 to 6 pairs, spreading, depressed on the upper surface, and raised on the lower (sometimes very much so); midrib much depressed on the upper surface and prominent on the lower (when dry); length 1.25 to 2 in.; breadth .75 to 1.25 in.; petioles .1 to .15 in. long, scaly. *Umbels* terminal, 4- to 7-flowered; the pedicels unequal, .5 to 1 in. long (longer in fruit). *Flowers* about .75 in. long. *Calyx* short, cupular, with many rounded teeth. *Corolla* yellow (sometimes very pale), .75 in. long, widely funnel-shaped, the mouth about .6 in. across, with 5 deep, broadly ovate, slightly spreading lobes, the outer surface with many dark-

coloured scales. *Stamens* about 8, slightly or not at all exserted; filaments glabrous; anthers elliptic, small. *Ovary* scaly; *style* slightly exserted, glabrous; *stigma* clavate-hemispheric, lobed. *Capsule* .5 in. long, scaly, shortly apiculate, 5-valved, the valves not twisted in dehiscence.

PERAK, at elevations of 5,000 to 7,000 feet: *Scortechini* 401B, 753; *Wray* 311, 1572, 3840; *Cantley*.

6. RHODODENDRON JASMINIFLORUM, Hook. Bot. Mag. t. 4524. Usually epiphytic; a small shrub, only a few feet high; young branches somewhat less than half as thick as a goose-quill, glabrous. *Leaves* in whorls, thickly coriaceous, almost sessile, broadly elliptic to elliptic-rotund, the apex acute, the base rounded and minutely cordate; upper surface when dry pale olivaceous-brown, sometimes with a few small loose scales, the 5 to 7 pairs of spreading main-nerves slightly distinct and (like the midrib) depressed; the lower darker brown, not olivaceous, the nerves very faint but the midrib pale and prominent; length 1.25 to 3 in.; breadth 1 to 1.5 in.; petiole .1 in. long. *Umbels* terminal, 8- to 20-flowered; the pedicels filiform, .75 to 1 in. long, scaly and hairy; bracteoles membranous, broad, glabrous, .25 to .5 in. long. *Calyx* a shallow toothed cup, less than .1 in. deep. *Corolla* white, salver-shaped; the tube narrowly cylindric, sparsely scaly or glabrous outside, about .15 in. in diam. and 1.25 to 1.6 in. long (when dry); the limb one-third as long, spreading, with 5 deep, broad, obovate-obtuse or rotund lobes. *Stamens* 10, the filaments shortly exserted, thin, pubescent; anthers short, broad. *Ovary* 5-celled, pubescent; style longer than the corolla-tube, pubescent; stigma depressed-capitate, grooved. *Capsule* about .75 to 1 in. long, narrowly sub-cylindric, much apiculate, ridged, its valves recurved to the base and often twisted. Lemaire, Jard. Fleur. t. 41; Illust. Hortie. (1859) t. 203; Clarke in Hook. f. Fl. Br. Ind. III. 463; Miq. Fl. Ind. Bat. II. 1059.

MALACCA, on Mount Ophir: *Griffith* (K.D.) 3504; *Maingay* (K.D.) 701; *Ridley*. PERAK: *Wray* 1635; *Scortechini*; *King's Collector* 3586, 3645, 6909; *Ridley* 124.—DISTRIB. Java, Sumatra.

7. RHODODENDRON LONGIFLORUM, Lindl. in Journ. Hort. Soc. III. 88 with figure. Epiphytic; 3 to 6 feet high; young branches half as thick as a goose-quill, densely scaly like the petioles. *Leaves* coriaceous, usually elliptic-oblong, sometimes elliptic or oblanceolate, sub-acute or acute, much narrowed to the base; upper surface when dry olivaceous-brown, coarsely and widely reticulate with broad black scales, especially on the depressed midrib, the 5 to 7 pairs of spreading main-nerves faint; lower surface brown, uniformly covered with black deciduous scales, ultimately glabrous; the main-nerves indistinct but the midrib

stout and prominent; length 2·25 to 3·5 in.; breadth ·8 to 1·5 in.; petioles ·35 to ·5 in. long, stout. *Umbels* terminal, 5- to 7-flowered; flower-pedicels ·5 to ·8 in. long, scaly or glabrous. *Flowers* about 2 in. long, glabrous outside, narrowly sub-campanulate, almost salver-shaped. *Calyx* small, cupular, with wavy edges, under ·05 in. deep. *Corolla* red, infundibuliform; its tube about ·25 in. wide near the base but expanding gradually to about ·4 in. or more near the mouth, about three times as long as the broadly bluntly 5-lobed limb. *Stamens* 10, the filaments slender, pubescent, slightly exserted; anthers short, blunt. *Ovary* densely hairy like the style; stigma clavate. *Capsule* unknown. Fl. des Serres, V. p. 477-480f.

PERAK: *Scortechini* 385, 553, 1409; *King's Collector* 1864, 5181.—  
DISTRIB. Borneo, Sumatra.

8. RHODODENDRON MALAYANUM, Jack in Mal. Misc. II. n. 7, 17. An erect straggling shrub, 3 to 15 feet high, all parts more or less glandular and scaly; young branches less than half as thick as a goose-quill. *Leaves* narrowly elliptic or lanceolate, the apex and base acute or sub-acute, the edges recurved when dry; upper surface shining, glabrous, and olivaceous when dry, the 5 to 8 pairs of main-nerves faint, slightly depressed, the midrib much depressed and often scaly; the lower of a deep uniform brownish-cinereous colour and with numerous dark scales, the nerves obsolete but the midrib bold and prominent; length 1·75 to 3·25 in.; breadth ·75 to 1·25 in.; petioles ·4 to ·6 in. long, covered with large black scales. *Umbels* terminal, 3- to 5-flowered. *Flowers* ·8 in. long, their pedicels ·25 to ·35 in. long, slender, scaly. *Calyx* cupular, 5-toothed, less than ·05 in. deep. *Corolla* red, glabrous, ·8 in. long (when dry), salver-shaped, the tube about ·2 in. in diam. when dry, about ·6 in. long, the limb about ·5 in. across when dry, with 5 broad, blunt, cuneate lobes. *Stamens* 10, their filaments glabrous. *Ovary* 5-celled; style slightly exserted from the throat of the corolla, glabrous; stigma clavate. *Capsule* about 1 in. long, slender, ridged, the valves much recurved, twisted. Hook. Journ. Bot. I. 369; DC. Prod. VII. 725; Bot. Mag. t. 6045; Beccari Malesia, I. 205; Clarke in Hook. f. Fl. Br. Ind. III. 463. *R. tubiflorum* and *R. celebicum*, DC. l.c. 725; Miq. in Ann. Mus. Lugd. Bat. I. 44, t. 2AB; Fl. Ind. Bat. II. 1059. *R. lampongum*, Miq. Fl. Ind. Bat. Suppl. 585. *Vireya tubiflora* and *V. celebica*, Blume Bijdr. 855, 854.

MALACCA: on Mount Ophir, 4,000 ft., *Griffith* (K.D.) 3503; *Maingay* (K.D.) 702; *Wray*; *Kurz*. PERAK: *Scortechini* 385, 2336; *Wray* 614; *King's Collector* 3227, 8076. PENANG: *Ridley* 125. SELANGOR: *Ridley* 7557.—DISTRIB. Sumatra, Java.

9. RHODODENDRON DUBIUM, n. sp., King & Gamble. A shrub or small

tree; young branches rather thinner than a goose-quill, pale brown when dry, slightly pubescent. *Leaves* coriaceous, glabrous, oblong-elliptic, the apex sub-acute, narrowed from about the middle to the acute or rounded base; both surfaces dull brown when dry and minutely reticulate, the lower pale; main-nerves 15 to 18 pairs, slightly curved, spreading, indistinct on the upper surface, rather distinct on the lower; the midrib very bold and prominent on the lower surface, faint and depressed on the upper; length 3·5 to 6 in.; breadth 1 to 2 in.; petiole ·75 to 1 in. long, stout. *Umbels* shortly stalked, 3- to 8-flowered; flower-pedicels unequal, ·75 to 1·35 in. long, stout, glabrous. *Flowers* unknown. *Calyx* cupular, ·1 in. deep, the mouth wavy. *Ovary* densely rufescent-pubescent. *Capsule* ·4 to ·7 in. long, rusty-pubescent, very slightly ridged, dehiscing by 5 straight valves, crowned by the persistent pubescent style.

PERAK, at an elevation of 3,400 feet: Wray 233, 460: *Scortechini* 367.

# 5. PERNETTYOPSIS, King & Gamble, nov. gen.

Small rigid epiphytic shrubs. *Leaves* alternate, on short hispid petioles, minutely sub-crenulate, coriaceous, persistent. *Flowers* solitary or in pairs, axillary, with 2 (rarely 3) rather large bracts at their bases forming an involucre; pedicels decurved in fruit. *Calyx* larger than the corolla, rotate, deeply 5-partite, persistent and unchanged in fruit. *Corolla* urceolate or ovoid, glabrous, the mouth constricted and with 5 short reflexed teeth. *Stamens* 10, free, included, the filaments slightly attached by their somewhat dilated bases to the bottom of the corolla-tube. *Anthers* short, inappendiculate at the back or base, oblong, the apices prolonged into 2 long porously dehiscing tubes. *Ovary* faintly 5-lobed, 5-celled; style columnar; stigma simple; ovules numerous, the placentas on the inner angles of the loculi. *Berry* globose, 5-celled. *Seeds* minute, compressed, numerous, angled; testa crustaceous.—DISTRIB. Species 2, both Malayan.

Calyx densely rusty-tomentose ..	..	..	..	1. <i>P. malayana</i> .
Calyx glabrous except the tips of the lobes ..	..	..	..	2. <i>P. sub-glabra</i> .

1. PERNETTYOPSIS MALAYANA, n. sp., King & Gamble. Epiphytic; a bush a foot or two in height; young branches half as thick as a goose-quill, sparsely clothed near their apices with flat adpressed black bristles less than ·1 in. long. *Leaves* thickly coriaceous, rotund, obovate to elliptic, the apex broad, minutely apiculate, the base slightly narrowed; upper surface olivaceous-brown when dry, shining, the midrib and main-nerves deeply depressed, the reticulations less so; lower

surface pale dull-brown, with sparse pits, each bearing a short adpressed dark hair, the edges wavy, sub-serrate and adpressed-ciliate; main-nerves 2 or 3 pairs, curving upwards and inwards and interarching, thick but faint on the lower surface; length 1.25 to 2 in.; breadth .75 to 1.35 in.; petioles .1 to .2 in., adpressed-bristly. *Flowers* solitary or in pairs, .4 or .5 in. long, axillary, pedicellate, the pedicels .3 to .4 in. long, twice as long (or more) in fruit, densely rusty-tomentose and recurved when young, erect and less woolly when old. *Involucral bracts* usually 2, thick, about .2 in. long, broad, glabrous inside, rusty-tomentose outside. *Calyx* larger than corolla, rotate, deeply divided into 5 lanceolate, somewhat spreading, lobes; rusty-tomentose outside and sub-glabrous inside. *Corolla* a little shorter than the calyx, glabrous, ovoid-globular, its mouth contracted and with 5 short reflexed teeth. *Stamens* 10, shorter than the corolla, and inserted near its base; *anthers* oblong, broad, cordate and inappendiculate at the base; the apex prolonged into 2 white apically porous tubes; filaments short, bent. *Ovary* sub-globular, laxly and deciduously tomentose, 5-celled; ovules numerous, oblong-concave, attached by the middle to the axillary placentas; style cylindric, slightly grooved, twice as long as the corolla. *Fruit* a berry with scanty pulp, blue when ripe, the seeds red.

PERAK, at elevations of about 6,500 feet, on the summit of Gunong Batu Pateh: *Scortechini* 402; *Wray* 312.

2. *PERNETTYOPSIS SUB-GLABRA*, n. sp., King & Gamble. A small, rigid, epiphytic shrub; young stems slightly thicker than a crow-quill, with a few adpressed bristles near the ends, otherwise glabrous. *Leaves* coriaceous, sub-rotund to elliptic-rotund, minutely apiculate; upper surface dull-brown, minutely reticulate, glabrous, the lower reddish-brown, with a few small adpressed hairs with black bases; main-nerves 3 or 4 pairs, curving upwards, deeply depressed on the upper surface like the midrib, less so on the lower; the edges minutely sub-serrate and sparsely adpressed-ciliate; length .8 to 1.5 in.; breadth .75 to 1.25 in.; petiole .15 to .25 in. long, adpressed-bristly. *Bracts* under the flower 2 or 3, broad, rusty-pubescent externally like the pedicel. *Calyx* longer than the corolla, rotate, with 5 deep lanceolate spreading lobes, glabrous except the rusty-pubescent tips. *Corolla*, stamens, ovary, and style as in *P. malayana*. *Fruit* unknown.

PERAK, at elevations of 5,000 feet: *Scortechini* 752; *King's Collector* 7407.

## Order LXVII. MONOTROPEÆ.

[By D. PRAIN.]

Leafless, erect, white or coloured root-parasites ; stems herbaceous, scaly, simple or forked. *Flowers* solitary on the stem or branches, regular, hermaphrodite. *Sepals* usually resembling the scales, 2 to 6, often deciduous. *Petals* 3 to 6. *Stamens* 6 to 12, hypogynous, 2-seriate ; filaments filiform or flattened ; anthers 2-celled, or by confluence 1-celled. *Ovary* superior, globose or fusiform, 1- to 6-celled ; style cylindric, stigma peltate ; ovules very many on axial or parietal placentas. *Fruit* capsular, loculicidally 4- to 6-valved, or indehiscent and baccate. *Seeds* very many, minute ; testa often loosely saccate ; embryo very minute, solid.—DISTRIB. Genera 9, in dense woods, mostly in temperate regions, all in the northern hemisphere.

## 1. CHEILOTHECA, Hook. fil.

Small herbs, with erect, simple or forked, white or coloured stems ; branches 1-flowered. *Sepals* 3 to 5, narrowly oblong like the uppermost stem-scales. *Petals* 3, erect, obtuse. *Stamens* 6 ; anthers linear, cells 2, confluent at the apex, dehiscing by marginal slits or pores. *Ovary* fusiform, 1-celled, narrowed into the cylindric style ; stigma globose-conic, usually slightly lobed ; placentas 6, parietal, 2-fid, the segments covered throughout by numerous ovules. *Fruit* fleshy, indehiscent, baccate.—DISTRIB. Species 2, Indo-Chinese and Malayan.

1. CHEILOTHECA MALAYANA, Scort. in Hook. fil. Icon. Plant., XVI. t. 1564. A root-parasite in dense forest ; stem herbaceous, erect, simple or 2- to 3-forked, 6 to 9 in. high, stoutish. *Scales* ovate-oblong, obtuse, imbricated, gradually increasing upwards, lurid purple (*Scortechini*) or waxy white (*Kunstler*). *Flowers* terminal on stem and branches, 1 in. long, hidden inside the uppermost scales, and bright yellow (*Kunstler*), or with the tips of the petals exerted and white (*Scortechini*). *Sepals* 5, resembling the uppermost scales, imbricate, linear-oblong, obtuse or sub-acute, glabrous. *Petals* 3, rather larger than the sepals, rounded-cucullate at the apex, externally glabrous, internally more or less pilose. *Stamens* 6, filaments puberulous or pilose, alternately somewhat shorter and longer ; anthers short, innate, hippocrepiform, cells confluent at apex, dehiscing by marginal pores. *Ovary* narrowly fusiform ; stigma obscurely 4-lobed ; placentas 6, parietal. *Fruit* white, fleshy, baccate, .75 in. across, tipped by the persistent remains of the stout style. Prain in Journ. As. Soc. Beng. LXXIII. 2, 205.

PERAK, in heavy jungle at about 3,500 feet elevation : *Scortechini* ;  
*Kunstler* 2715.

According to the field notes recorded by these two careful collectors the specimens gathered by Kunstler differ from those obtained by Scortechini ; in the latter the scales were lurid purple and the flowers were white, in the former the scales were waxy white and the flowers bright yellow. The petals in Kunstler's plant are sparingly hirsute within and the anthers are nearly twice as long. In other respects, however, the two plants are identical, and the doubt that one feels in connection with the two is not so much as to whether they are conspecific, as it is as to whether this Malayan *Cheilothea* be really specifically separable from the species from the Khasia Hills upon which Hooker originally based the very distinct genus *Cheilothea*. The only very tangible differences are that in the Khasia plant only 3 to 4 scales can be with propriety considered sepals, whereas in the Malayan one the number of sepals, as apart from the upper scales or bracts, is 5 ; and that in the Khasia plant the anthers are long, like linear lips on each side of the connective, whereas in the Malayan plant the anthers are much shorter and distinctly hippocrepiform. The fruit appears to be quite indehiscent, and thus deviates from the fruit in other genera of *Monotropææ*, which, so far as is known, is always loculicidally dehiscent.

#### Order LXVIII. EPACRIDEÆ.

Shrubs or small trees. *Leaves* alternate, rarely sub-opposite or pseudo-verticillate, articulated with the branches, sometimes fascicled or imbricate, coriaceous or rigid, persistent, entire, with parallel longitudinal nerves ; ex-stipulate. *Flowers* hermaphrodite, solitary and axillary or terminal, spicate or racemose, generally white or red ; usually bracteate and usually 2-bracteolate, the bracteoles similar to the sepals. *Calyx* 4- to 5-partite, the segments coriaceous, striate, imbricate, persistent. *Corolla* 4- to 5-fid, monopetalous, deciduous or sometimes marcescent ; the tube short or long, often cylindric or funnel-shaped ; the lobes short or long, erect, patent or recurved, imbricate or valvate, persistent. *Stamens* 5, rarely 4, hypogynous or epipetalous, the filaments short or long, filiform or flattened, free ; the anthers dorsifixed, oblong, dehiscing along their whole length by a single slit, 1-celled or spuriously 2-celled. *Disk* cupular, annular or of simple or bifid scales equal in number to the carpels. *Ovary* globose or ovoid, 1- to 10-celled ; style terminal, short or long, filiform ; stigmas punctiform, discoid or lobulate, sometimes annular or indusiate ; ovules in each cell solitary, pendulous, rarely erect ; or many on a central placenta. *Fruit* drupaceous, with 2 to 5 1-seeded pyrenes ; or a many-seeded capsule. *Seeds* small, with fleshy albumen, testa membranaceous ; embryo axile, orthotropous, smooth ; cotyledons short ; radicle elongate, near the hilum.—DISTRIB. About 320 species, nearly all Australian, a few in



New Caledonia and New Zealand, the Pacific Islands, or the Malay Archipelago.

LEUCOPOGON, Br.

Shrubs, erect or prostrate, branching, rarely trees. *Leaves* various, sessile or petiolate, striate-nerved. *Flowers* small, white, in axillary or terminal spikes or racemes, the rachis ending in an imperfect flower; bract 1, bracteoles 2 to 3 under the calyx. *Calyx* 5-partite. *Corolla*-tube funnel-shaped or campanulate; lobes 5, valvate in bud, patent or upper part recurved, hairy within. *Stamens* fixed to the top of the corolla-tube, filaments short, filiform; anthers dorsifixed, included or semi-exsert, linear or oblong. *Ovary* 2- to 5-celled; style short or elongated, terminal; stigma sub-capitate; ovules solitary in each cell, pendulous. *Fruit* drupaceous, with a crustaceous or bony endocarp, 1- to 5-celled, cells 1-seeded. *Seeds* small.—**DISTRIB.** About 130 species, all but about 20 Australian, the rest in New Zealand, the Pacific Islands, and the Malay Archipelago.

LEUCOPOGON MALAYANUS, Jack in Mal. Misc. I. v. 20, and Hook. Bot. Misc. II. 71. A small branching shrub, reaching 3 to 6 feet in height; branches grey, marked by the scars of fallen leaves, branchlets very leafy; branch-buds elongate, supported by imbricate parallel-veined ciliate deciduous scales. *Leaves* alternate, sessile, stiff, entire, narrowly lanceolate, acute and mucronate at apex, 1·5 to 2·5 in. long, .3 to .5 in. broad, shining and convex above, dull or glaucous beneath, ciliate when young; midrib none, nerves very close, slender, longitudinally parallel, in old leaves scarcely visible. *Flowers* in short axillary 3- to 7-flowered spikes, .5 in. long, the last flower imperfect; rachis villous, sometimes flexuose; bracts ovate, recurved, bracteoles 2, ovate, acute, ciliate, closely embracing the calyx. *Calyx*-lobes 5, crustaceous, elliptic-oblong, .125 in. long, ciliate. *Corolla* campanulate, .1 to .2 in. long; lobes 5, .1 to .15 in. long, spreading, villous within. *Hypogynous scales* 5, minute, free, obtuse. *Stamens* 5, short, alternate with the corolla-lobes; filaments inserted near the top of the anthers; anthers curved, pendent, opening longitudinally; pollen globose. *Ovary* 5-celled; ovule 1 in each cell, oblong; style erect, .05 in. long, villous; stigma sub-globose. *Fruit* a 5-celled baccate drupe, .1 to .2 in. in diam., each cell 1-seeded. *Seeds* not seen. Wall. Cat. 3720; Wall. in Roxb. Fl. Ind., ed. Carey and Wall. II. 301; G. Don Gen. Syst. III. 777; DC. Prod. VII. 744; Miq. Fl. Ind. Bat. II. 1052; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 95; Clarke in Hook. f. Fl. Br. Ind. III. 477. *Styphelia malayica*, Spreng. Syst. IV. Cur. post, 67.

PERAK: *Scortechini* 760; *Cantley* 46; *King's Collector* 7428, 8056.

MALACCA: *Jack*; *Griffith* (K.D.) 3453/1; *Maingay* (K.D.) 704; *Lobb*; on Mount Ophir, *Moxon*; *Ridley*. SINGAPORE: *Jack*; *Sir R. Schomburgk* 50; *Wallich* 3720; *Ridley* 1832.—DISTRIB. *Bangka*, *Teysmann*; *Borneo*, *Ridley*.

VAR. *moluccana*, *Kurz* in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 96. *Leaves* .5 to 1 in. long, subulate-pointed, venation more prominent, branchlets more slender. *L. moluccanum*, *Scheff.* Obs. Phyt. III. 97.

KEDAH peak: *Low*.—DISTRIB. *Tenasserim*, *Helfer* (K.D.) 3453.

### Order LXIX. PLUMBAGINEÆ.

Herbs or undershrubs. *Leaves* various, alternate or fascicled. *Flowers* in terminal scapes or branches, capitate, spicate, racemed or paniced; bracts scarious or leafy, often sheathing the flower, bracteoles 2. *Calyx* inferior, gamosepalous, tubular or funnel-shaped, 5- to 10-ribbed, often hyaline between the ribs; lobes 5, usually scarious. *Corolla* hypogynous; petals 5, free or connate at the base or united in a linear tube; lobes spreading. *Stamens* 5, opposite the petals; filaments free or adnate in a tube with the corolla; anthers ovate or oblong, dorsifixed, cells parallel, dehiscing longitudinally. *Ovary* superior, sessile or very shortly stalked, 1-celled, 5-angular above; styles 5, distinct from the base or connate below; stigmas sub-capitate; ovule 1, pendulous from a basal ascending funicle, anatropous. *Fruit* included in the calyx or elongate or exsert, dry or indehiscent, membranous or hardened at the apex, circumsciss or breaking near the thin base, the apex often 5-valved. *Seeds* cylindric or elongate, pendulous, albumen copious or little or 0, radicle superior; embryo straight, cotyledons linear or oblong.—DISTRIB. Species about 200, mostly of sea-coasts or desert places throughout the world.

Large shrubs with broad-petioled leaves; styles 5, distinct; stamens united in a tube with the corolla .. .. 1. *ÆGIALITIS*.  
Perennial herbs with auriculate leaves; style 1, filiform, with 5 stigmatic branches; stamens free .. .. 2. *PLUMBAGO*.

#### 1. *ÆGIALITIS*, R. Br.

Simple-stemmed, soft-wooded shrubs. *Leaves* orbicular, alternate, coriaceous, glabrous, entire, smooth, gland-dotted, reticulately-veined, with long, thick, winged, amplexicaul petioles. *Flowers* in axillary or terminal panicles of racemes; bract 1, sheathing, coriaceous, obtuse; enclosing the 2 bracteoles. *Calyx* tubular, folded; lobes 5, short, induplicate-valvate. *Corolla* usually shorter than calyx, lobes 5,

slightly cohering at base. *Stamens* adhering to the base of the petals. *Ovary* 1-celled; styles free, stigmas capitate. *Fruit* a capsule, linear, long-exserted from the calyx, pentagonal, 1-seeded.—**DISTRIB.** Species 2, one Indian the other Australian.

*ÆGIALITIS ROTUNDIFOLIA*, Roxb. Fl. Ind. II. 111. A simple-stemmed, soft-wooded shrub, 3 to 8 feet high; stem about 3 in. in diam., conical in shape. *Leaves* alternate, orbicular, very slightly acute at apex, rounded or slightly cordate at base, diam. 2 to 3 in., entire, glabrous, coriaceous, minutely glandular-dotted, shining above, dull beneath; midrib thick and prominent, veins at an angle of 60 degrees with the midrib, closely reticulate; petiole very stout, 2 to 3 in. long, prominently winged, the wings sheathing, amplexicaul, leaving annular scars when they fall. *Inflorescence* of axillary or terminal panicked racemes; flowers pale yellow, nearly sessile, enclosed in sheathing bracts; bract 1, .3 to .4 in. long, concave, obtuse, enclosing the two similar but smaller bracteoles. *Calyx* cylindric, furrowed, .2 to .3 in. long; teeth 5, short. *Corolla* slightly longer than calyx; lobes 5, narrow. *Stamens* inserted on the base of the corolla; filaments shorter than corolla-tube; anthers linear-oblong. *Ovary* 1-celled, styles free, stigma capitate, ovule 1 pendulous. Wall. Cat. 7240; Griff. Notul. IV. 207; Clarke in Hook. f. Fl. Br. Ind. III. 479; Prain Beng. Plants I. 638. *Æ. annulata* var. *rotundifolia*, DC. Prod. XII. 621. *Æ. annulata*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; For. Fl. II. 96 (not of R. Br.). *Ægianilites rotundifolia*, Presl. Bot. Bemerk. 103.

**MALACCA:** Griffith (K.D.) 4156.—**DISTRIB.** Coasts of Bengal and Burma and the Andaman Islands, in mangrove swamps.

## 2. PLUMBAGO, Linn.

Perennial herbs or undershrubs, rarely annual, branches usually straggling or sub-scandent. *Leaves*, if present, alternate, entire, the petioles usually amplexicaul, auriculate at base. *Flowers* in terminal spikes or spicate racemes, forming sometimes a leafy terminal panicle; bract 1, bracteoles 2, usually small. *Calyx* tubular, glandular, 5-fid, the teeth erect. *Corolla* funnel-shaped; tube slender, lobes spreading. *Stamens* free; filaments filiform, inserted on hypogynous glands; anthers oblong, dorsifixed, usually exsert. *Ovary* attenuate at apex; style slender, divided into stigmatose branches; ovule 1, pendulous from a basal ascending funicle. *Fruit* a capsule, included in the persistent calyx and corolla, circumsciss near the base, hardened above; seed solitary, albumen very small, embryo slender, radicle superior, cotyledons oblong.—**DISTRIB.** About 10 species, found in the warm regions of both hemispheres.

**PLUMBAGO ZEYLANICA**, Linn. Sp. Pl. (1753) 151. A straggling perennial herb; branches rounded, striate, glabrous. *Leaves* alternate, ovate, shortly acute at apex, rounded at base and suddenly narrowed and decurrent, 2 to 5 in. long, 1 to 2·5 in. broad, entire, thin, glabrous above, somewhat scurfy beneath and often glaucous; midrib slender, prominent beneath, main-nerves 6 to 7 pairs, also prominent, curving upwards, secondary nerves and reticulations obscure; petiole ·5 to 1 in. long, winged by the gradually narrowing decurrent base of the blade, auricled and amplexicaul at base. *Inflorescence* a terminal leafy panicle of spicate racemes, the rachis densely glandular; bract ovate, acuminate, bracteoles 2, linear-subulate; pedicels very short or none, bracts and pedicels glandular. *Calyx* narrowly tubular, about ·5 in. long, more or less deeply 5-fid; lobes slender, hyaline on the margins, covered thickly on the back with prominent stalked red glands. *Corolla*-tube white, slender, funnel-shaped, membranous, about 1 in. long; lobes 5, nearly ·5 in. long, ovate, acute, patent. *Stamens* 5, free; filaments very slender; anthers oblong, dorsifixed, exsert. *Ovary* ovoid; style filiform, dividing into 5 stigmatose branches. *Capsule* membranous below, thick above, 5-furrowed, sharply pointed; seed pendulous, oblong; cotyledons obtuse. DC. Prod. XII. 692; Roxb. Hort. Beng. 13, Fl. Ind. I. 462; Wall. Cat. 7241g; Wight Ill. t. 179; Miq. Fl. Ind. Bat. II. 994; Dalz. and Gibs. Bomb. Fl. 220; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; Clarke in Hook. f. Fl. Br. Ind. III. 480; Trimen Fl. Ceyl. III. 65; Prain Beng. Plants I. 639. *P. auriculata*, Bl. Bijdr. 736. *P. viscosa*, Blanco Fl. Filip. ed. I. 78. 'Tumbacodivéli,' Rheede Hort. Mal. X. t. 8.

PENANG: Curtis 93; Deschamps. NEGRI SEMBILAN: Ridley 10095. SINGAPORE: Deschamps; King's Collector 284.—DISTRIB. Tropical regions of the Old World, doubtfully indigenous in the Malay Peninsula or elsewhere.

## Order LXXVIII. GENTIANACEÆ.

[By C. B. CLARKE.]

Herbs, erect, twining, or floating; glabrous except *Microphium*. *Leaves* entire; those of the lower main stem opposite except in the floating plants. *Inflorescence* in 2- to 3-divided cymes, or peduncles 1-flowered. *Flowers* symmetric in calyx, corolla, stamens (except in *Canscora*). *Calyx* tubular or campanulate; lobes 4 to 5 (or by accident (?) 6), oblong or linear. *Corolla* gamopetalous, tube long or short; lobes as many as calyx-segments, usually dextrorsely contorted in the bud. *Stamens* as many as the corolla-segments, all perfect (except in

*Canscora*); filaments on the corolla-tube; anthers of 2 parallel cells. Ovary 1- (or imperfectly 2-) celled; of 2 carpels, superior or stalked or slightly inferior; style linear or oblong; stigma capitate or shortly 2-lobed; placentas parietal, sometimes much intruded, partly coalescing in the axis; ovules very many. Capsule dehiscent or indehiscent, not rarely becoming more or less succulent; seeds many, albuminous.—DISTRIB. Species 700; found in all countries.

Erect herbs; lower stem leaves (often all the leaves) opposite:—

Glabrous; corolla blue .. ..	1. EXACUM.
Pubescent all over .. ..	2. MICRORPHIUM.
Glabrous; corolla rose-coloured or white ..	3. CANSCTORA.
Twining; corolla narrow, more than 1 in. long ..	4. CRAWFURDIA.
Floating (or creeping on mud); leaves round-ovate:—	
Peduncles solitary, from the axil of a long-petioled leaf ..	5. VILLARSIA.
Peduncles clustered, from the axil of a sessile leaf. .	6. LIMNANTHEMUM.

# 1. EXACUM, Linn.

Glabrous erect herbs. Leaves opposite, usually 3- to 5-nerved. Flowers paniced, 4- to 5-merous. Calyx deeply lobed. Corolla rotate; tube globose; lobes ovate or oblong, blue or white. Stamens attached in the corolla throat; anthers large, of two oblong cells, which open first by terminal pores or short slits. Ovary more or less completely 2-celled; style linear; stigma sub-capitate. Capsule globose, septically 2-valved; seeds numerous, minute, cuboid.—DISTRIB. Species 30, whereof 20 Indian, the others in China, Malaya, Africa.

Stem 1 to 4 feet; corolla-lobes $\frac{1}{2}$ in. long, azure blue ..	1. <i>E. tetragonum</i> .
Stem 4 to 12 in.; corolla-lobes $\frac{1}{4}$ to $\frac{1}{3}$ in. long, pale blue ..	2. <i>E. pedunculatum</i> .

1. EXACUM TETRAGONUM, var.  $\beta$  *stylosa*, C. B. Clarke in Hook. fil. Fl. Br. Ind. IV. 95. Stem 1 to 4 feet, quadrangular. Leaves 5 by 1 in., sessile, lanceolate, 3- to 5-nerved. Panicle many-flowered; bracts at its divisions .25 to .5 in. long, linear; flowers 4-merous, or rarely 5-merous. Calyx-lobes .25 in. long, ovate acuminate. Corolla-lobes .5 in. long, broadly elliptic acute, full azure-blue. Anthers .2 in. long, straight. Style .5 in. long. Capsule globose, .25 in. in diam. *E. stylosum* (sp.), Griseb. in DC. Prod. IX. 46. *E. chironioides*, Griseb. Gent. 109, in DC. Prod. IX. 45. *E. Horsfieldianum*, Miq. Fl. Ind. Bat. II. 556. *E. sulcatum*, C. B. Clarke in Journ. Linn. Soc. XIV. 425 (not of Roxb.). *E. tetragonum*, Vidal Fl. Filip. 191.

SINGAPORE: Lobb 473.—DISTRIB. From Burma to Borneo and the Philippines.

2. EXACUM PEDUNCULATUM, Linn. Sp. Pl. ed. I. 112; ed. II. 163.

*Stem* 4 to 12 in., quadrangular, often much-branched. *Leaves* 1·5 by ·5 in., sub-sessile, elliptic or lanceolate, 3-nerved. *Panicle* usually compound, many-flowered; lower bracts similar to the leaves, by degrees smaller, to the upper less than ·25 in. long; flowers 4-merous. *Calyx-lobes* ·17 to ·2 in. long, ovate, acute, winged. *Corolla-lobes* ·25 to ·35 in. long, pale blue. *Anthers* ·12 in. long, dehiscing finally half-way down. *Capsule* globose, ·17 in. in diam. DC. Prod. IX. 46; Hook. fil. Fl. Br. Ind. IV. 97; Trimen, Fl. Ceyl. III. 182. *E. pedunculare*, Arn. in Ann. Sc. Nat. ser. 2, XI. 176; Wight Ic. t. 336. *E. sulcatum*, Roxb. Fl. Ind. ed. Carey & Wall. I. 415; DC. Prod. IX. 46 (*syn. excl.*).

SINGAPORE: *Lobb* 358.—DISTRIB. From Oudh and Bengal to Ceylon and Pegu.

## 2. MICRORPHIUM, C. B. Clarke, gen. nov.

A pubescent erect herb, repeatedly branched. *Leaves* alternate except a few distant opposite pairs on the main stem. *Flowers* numerous, solitary, pedicelled, in unilateral repeatedly branched cymes. *Calyx* short-cylindric, terete, sub-2-lipped, almost leathery; lobes 5, short. *Corolla* small; tube campanulate, lobes 5, equal, dextrorsely contorted in the bud. *Stamens* 5, equal, perfect; anthers exsert, cells oblong, parallel, dehiscing by a slit their whole length. *Ovary* 1-celled; placentas intruded; style linear, stigma sub-capitate. *Seeds* very small, ovoid, not angular.—DISTRIB. Species 1, Malayan.

1. MICRORPHIUM PUBESCENS, C. B. Clarke, sp. nov. *Stem*, leaves, inflorescence, calyx covered with a short thick grey pubescence. *Stem* (upper part seen) 14 in. long; the lower part with opposite pairs of leaves (and branches) 2·5 in. apart; all the other numerous stem-divisions and leaves alternate. *Leaves* of the main stem ·75 by ·35 in., elliptic, entire, obtuse, narrowed at base; petiole 0 to ·1 in. long; the other leaves similar but smaller. *Pedicels* ·25 in. long. *Calyx* ·2 in. long; opening at first in two lips, one emarginate 2-nerved, the other ovate 3-nerved. *Corolla-tube* broad, lobes short, round, soon reflexed over the calyx-margin. *Capsule* ovoid, ·2 in. long, dry; seeds 200  $\mu$  in diam. *Pollen* globose; 25  $\mu$  in diam.

KEDAH: *Curtis* 2528. "Height 1 to 2 feet; petals white; anthers yellow" (*Curtis*).

## 3. QANSCORA, Lam.

Herbs, dichotomously branched, glabrous or very nearly so. *Leaves* opposite. *Flowers* mostly cymose. *Calyx* large, membranous, tubular, often winged; teeth much shorter than the tube. *Corolla-tube* cylindric; lobes 4, unequal (except in *C. pentanthera*). *Ovary* 1-celled;

placentas intruded; style linear, lobes 2, hemispheric. *Capsule* 2-valved or breaking up irregularly. *Seeds* very small, polyhedral.—**DISTRIB.** Species about 25, extending from Africa through South-east Asia to Australia.

One stamen only perfect; corolla irregular	..	..	1. <i>C. diffusa</i> .
All stamens perfect; corolla regular	..	..	2. <i>C. pentanthera</i> .

Sub-genus 1. EU-CANSCORA. Calyx 4-toothed. Corolla sub-bilabiate. Stamens 4; 1 larger perfect, 3 shorter smaller or obsolete.

1. CANSCORA DIFFUSA, R. Brown, Prodr. (1810) 451 in Obs. Erect annual, 4 to 20 in., much branched upwards. *Leaves* 1·5 by ·5 in., lanceolate or elliptic, 3-nerved, often petioled, upper smaller. *Cyme* diffuse; lower bracts at its divisions ·5 in. long, ovate, upper much smaller. *Calyx*  $\frac{1}{2}$  in. long; teeth lanceolate-linear. *Corolla* rose-coloured; tube  $\frac{1}{2}$  in., lobes  $\frac{1}{2}$  in. *Capsule* oblong, as long as the calyx. DC. Prod. IX. 64; Benth. Fl. Austral. IV. 372; Hook. fil. Fl. Br. Ind. IV. 103; Trimen Fl. Ceyl., III. 184. *Exacum diffusum*, Willd. Sp. Pl. I. 637. *Orthostemon erectum*, R. Br. Prod. 451; DC. l.c. 63. *O. Hugelii*, DC. l.c. 63. *Pladera virgata*, Roxb. Fl. Ind. ed. Carey & Wall. I. 417; Hook. Bot. Misc. III. 88 t. 25.

SINGAPORE: *Lobb* 345. A common species, extending from East Tropical Africa throughout India to Australia and the Philippines.

Sub-genus 2. PENTANTHERA. Stamens 5 (or 6), equal, anthers all similar, perfect. Corolla-lobes 5 (or sometimes 6), equal, dextrorsely contorted in the bud.

2. CANSCORA PENTANTHERA, C. B. Clarke, sp. nov. A slender under-shrub, 18 in. high, glabrous except the minutely gland-puberulous (young) petioles; stem terete with many opposite branches. *Leaves* opposite, 3 by 1 in., ovate-lanceolate, acuminate, attenuate at the base; petiole 0 to ·2 in. *Cymes* loosely, repeatedly dichotomous, often carrying 10 flowers; bracts at the divisions similar to the leaves, but gradually smaller, becoming sessile, a few pairs connate into perfoliate bracts. *Flowers* solitary, ·5 in. long, on pedicels ·12 to ·5 in. long. *Calyx* ·35 in. long, membranous; tube triquetrous, narrowly 3-winged, ovoid-cylindric; lobes less than one-third the length of the tube, ovate, imbricate, apiculate. *Corolla* white (*Ridley*); tube as long as the calyx, lobes 5 (or not rarely 6), oblong-elliptic, equal, sub-erect, contorted dextrorsely (*sensu Linneano*) in the bud. *Stamens* 5 (or 6 in the 6-lobed corolla), equal, perfect; filaments inserted in the upper part of the corolla-tube from which the erect anthers are half-exsert; anther-cells 2, oblong or linear-oblong, opening by longitudinal slits; pollen 25 by 20  $\mu$ , ellipsoid, irregularly longitudinally striate. *Ovary* oblong, when young thin,

almost succulent; placentas much intruded; style linear, with 2 round stigmatic lobes. *Capsule* broad-ellipsoid, crustaceous, almost succulent (dehiscence not clear); style persistent; seeds 300  $\mu$  in diam., ovoid, somewhat angular; brown.

PERAK, Waterloo: *Robertson* 9088. SELANGOR: Sua Batu, *Ridley*; Gua Batu, *Ridley* 8218. KEDAH: Langkau, *Curtis* 2516.

This species, the only one in the sub-genus, differs in the aestivation of the corolla, the number of the stamens, the anthers all equal, the persistent style, from the characters assigned to *Canscora*.

#### 4. CRAWFURDIA, Wall.

Glabrous twiners. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary. *Calyx* tubular; teeth 5 (or 4), long, often very long. *Corolla* long, tubular-funnel-shaped; lobes 5, short. *Stamens* 5 on the corolla-tube; anthers oblong. *Ovary* stalked, 1-celled, placentas parietal; style linear, stigmas 2, short-oblong. *Fruit* globose or ellipsoid, berried or capsular; seeds many, 2- (or imperfectly 3-) angled.—DISTRIB. Species 10–12, extending from India to Manchuria.

1. CRAWFURDIA BLUMII, G. Don Syst. IV. 200. *Stem* often 3 to 4 feet long. *Leaves* (blade) 1·5 by ·75 in., ovate-lanceolate, acute, entire; base rounded or narrowed; petiole ·35 in. *Flowers* axillary, solitary, sub-sessile, or the pedicel ·25 to 1·5 in. long. *Calyx* narrow, angular; tube ·2 in. long, teeth ·25 in. long, linear. *Corolla* 1·25 to 1·5 in. long, light purple. *Fruit* ·6 in. long, ellipsoid, purple, succulent. *Seeds* imperfectly 3-angular, angles (or 2 of them) often narrowly winged. Miq. Fl. Ind. Bat. v. II. 561 (*Blumei*). *C. trinervis*, Hassk. Cat. Hort. Bogor. 128, in Tidjsch. Nat. Gesch. X. 126. *Tripterospermum trinerve*, Blume Bijl. 849; Griseb. in DC. Prod. IX. p. 121. [Cf. C. B. Clarke in Fl. Br. Ind. IX. p. 107, sub *Crawfurdia affini*, Wallich.]

PAHANG, 7,000 feet alt.: *Wray* 1570.—DISTRIB. Sumatra, Java.

#### 5. VILLARSIA, Vent.

Floating, glabrous herbs. *Leaves* long-petioled, ovate, entire or sinuate. *Peduncles* solitary, 1- (or many-) flowered. *Calyx* deeply 5-lobed. *Corolla* broadly campanulate; tube short, lobes sub-rotate. *Stamens* 5; filaments filiform, on the corolla-tube; anthers sagittate. *Ovary* 1-celled; style short; stigma of 2 small lobes; placentas parietal. *Capsule* globose, 1-celled, 4-valved at the apex; seeds several (or numerous).—DISTRIB. Species 12, in Africa or in Australia, except the following Malay species.

1. VILLARSIA AURANTIACA, *Ridley* MS. A small herb; stems 2 in.



long, with leaves and peduncles at the nodes. *Leaves* all long-petioled, .35 in. in diam., widely excavated at the base, ovate, margin sinuate; petiole .5 to 2 in. long. *Peduncles* solitary, 1 to 2 in. long, ebracteate, 1-flowered. *Calyx* .17 in. long, lobes oblong. *Corolla* .35 in. in diam.

PAHANG: Kwala Pahar, Ridley.

This example shows no fruit, and the flowers are not in a state for dissection. This collection has been supposed to be near *Limnanthemum parvifolium*, Griseb., which has smaller flowers, with the peduncles (several) clustered in the axil of a sessile leaf. This plant of Ridley appears to come near the Swan River *Villarsia violifolia*, F. Muell.

#### 6. LIMNANTHEMUM, S. P. Gmel.

*Peduncles* several in the axil of a nearly sessile leaf. *Capsule* thin, breaking up irregularly, otherwise as *Villarsia*.—DISTRIB. Species 20, dispersed throughout the Tropical and Temperate Zones.

1. LIMNANTHEMUM PARVIFOLIUM, Griseb. in DC. Prod. IX. 141. *Stem* 3 to 8 in. long, slender, with distant nodes. *Leaf* .75 in., round, ovate, excavated at base, gland-dotted on the under surface; petiole scarcely .08 in. *Pedicels* clustered, 0 to .25 in. long. *Calyx-lobes* .08 in. long, lanceolate, acute. *Corolla-lobes* .17 in. long, white, fimbriate. *Capsule* .17 in. long, ellipsoid, sessile, about 10-seeded; seeds smooth but with capitate papillæ sparsely irregularly scattered. Hook. fil. Fl. Brit. Ind. IV. 132; Trimen, Fl. Ceyl. III. 189.

SINGAPORE: *Cuming* 2280 (in Mus. Brit.).—DISTRIB. Malabar, Ceylon; Chittagong to Tavoy.

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# JOURNAL

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., F.L.S., *late Superintendent of the Royal Botanic Garden, Calcutta, and* J. SYKES GAMBLE, Esq., C.I.E., M.A., F.R.S., F.L.S., *late of the Indian Forest Department.*

No. 17.

This contribution embraces the Natural Orders *Myrsinaceæ*, *Sapotaceæ*, *Ebenaceæ*, *Styraceæ*, *Oleaceæ*, which are given under the joint names of the authors, the actual descriptions having been prepared by Sir George King for the *Ebenaceæ* and by Mr. J. S. Gamble for the rest.

The 5 Natural Orders comprise 24 genera and 221 species. There are no new genera, but the number of new species reaches 103.

#### Order LXX. MYRSINACEÆ.

Trees, shrubs (erect or climbing), or undershrubs, generally evergreen. *Leaves* usually alternate, sometimes opposite, entire dentate or crenate, often dotted with pellucid round or linear resinous glands. *Stipules* none. *Flowers* regular, usually small, white or reddish; hermaphrodite or occasionally polygamo-diœcious; generally in panicles, racemes or umbels. *Calyx* inferior (in *Mæsa* adnate to the ovary), 4-6-lobed, the lobes valvate or imbricate, sometimes enlarged in fruit, persistent, often marked with glandular dots or lines. *Corolla* 4-5-lobed; the tube usually very short, sometimes wanting; lobes twisted to the left in the bud, usually overlapping to the right, rarely

valvate, often gland-dotted or -striate. *Stamens* opposite to the corolla-lobes and equal to them in number, free or adnate to the lobes or in an inner ring, generally erect; filaments long or short; anthers opening by slits, usually introrsely, sometimes septate as in *Ægiceras* and *Ardisia littoralis*, sometimes with terminal openings as well, free or adherent by their edges; the connective often thickened and produced, sometimes glandular; staminodes sometimes present, though not in Malay species. *Ovary* globose, ovoid or oblong, free (in *Mæsa* adherent to the calyx-tube), 1-celled, narrowed into or surmounted by the style; style filiform or columnar, stigma usually simple; ovules few or many, inserted on or immersed in a free usually globose central placenta. *Fruit* usually small, globose (in *Ægiceras* linear, curved, acuminate); epicarp fleshy, mesocarp crustaceous, endocarp membranous, separable; usually one- rarely several-seeded (as in *Mæsa*), indehiscent. *Seeds* usually globose, hollowed at the base: in *Mæsa* many and angled; albumen pitted or ruminate; embryo transverse, cylindric; radicle usually elongate.—**DISTRIB.** Tropical or sub-tropical regions of both hemispheres, chiefly in Asia and South America; genera 32, species upwards of 900 (according to Mez Monog. *Myrsineæ*).

Calyx-tube adnate to the ovary; fruit many-seeded (Tribe I. **MÆSEÆ**):—

Trees or shrubs; calyx 2-bracteolate; flowers in simple or compound racemes .. .. . 1. **MÆSA.**

Calyx-tube free from the ovary; fruit one-seeded (Tribe II. **EUMYRSINEÆ**):—

Fruit round; anther-cells usually opening by slits, rarely septate:—

Corolla-lobes imbricate in bud:—

Flowers in axillary or lateral fascicles; trees or shrubs .. 2. **MYRSINE.**

Flowers in racemes or panicles; climbing plants, rarely shrubs .. .. . 3. **EMBELIA.**

Corolla-lobes valvate in bud; flowers in paniculate spike-like racemes; small shrubs with parallel-veined leaves .. 4. **LABISIA.**

Corolla-lobes contorted in bud:—

Anthers sagittate, rarely septate; corolla-lobes overlapping to the right .. .. . 5. **ARDISIA.**

Anthers sagittate-lanceolate, the connective produced in a membranous wing; corolla-lobes overlapping to the left .. 6. **ANTISTROPHE.**

Fruit elongate, cylindric, long-pointed; anthers markedly septate 7. **ÆGICERAS.**

### 1. **MÆSA**, Forsk.

Trees or shrubs, erect or straggling. *Leaves* entire, dentate or serrate, usually pellucid-punctate, sometimes with resinous lines. *Flowers* hermaphrodite or unisexual, in terminal or axillary racemes, the pedicels bracteate. *Calyx* bibracteolate, 4–5-lobed; lobes persistent,

imbricate; the tube adnate to the ovary, sometimes with resinous lines. *Corolla* shortly campanulate, 4–5-lobed; the lobes usually as long as the tube or rather shorter, rounded with inflexed tips, sometimes resinous-lineate. *Stamens* 4 or 5, inserted on the corolla-tube; filaments short; anthers introrse, oblong-cordate. *Ovary* adnate to the calyx-tube; style short; stigma small, entire or shortly 3–5-lobed; ovules numerous, placenta globose. *Fruit* small, dry or fleshy, ovoid or subterbinate, crowned with the persistent style, many-seeded. *Seeds* numerous, angular, immersed in hollows of the placenta, and arranged around it with hexagonal surfaces, embryo small, oblique or transverse, cotyledons narrowly ovate.—DISTRIB. Species over 100 (according to Mez), chiefly in the tropical regions of the Old World, a few in Australia and the Pacific Islands; all the Malayan species belonging to sub-genus *Eumæsa*, Mez.

Leaves entire :—

- |                                                                                                              |                            |
|--------------------------------------------------------------------------------------------------------------|----------------------------|
| Flowers in large terminal leafy panicles; branches of the inflorescence pubescent .. .. .                    | 1. <i>M. macrothyrsa</i> . |
| Flowers in large axillary or pseudo-terminal panicles of racemes; branches of inflorescence glabrous .. .. . | 2. <i>M. ramentacea</i> .  |

Leaves faintly lobed :—

- |                                                                                                                                                                                   |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Leaves very slightly dentate, almost coriaceous, under 3·5 in. long, midrib and main-nerves very prominent; inflorescence as long as or only a little shorter than leaves .. .. . | 3. <i>M. impressinervis</i> . |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|

Leaves membranous, over 4 in. long :—

- |                                                                                                           |                           |
|-----------------------------------------------------------------------------------------------------------|---------------------------|
| Leaves pale when dry, under 3 in. broad, distantly dentate, inflorescence longer than the petiole .. .. . | 4. <i>M. striata</i> .    |
| Leaves dull green when dry, over 4 in. broad, inflorescence scarcely longer than the petiole .. .. .      | 5. <i>M. pahangiana</i> . |

- |                                    |                       |
|------------------------------------|-----------------------|
| Leaves prominently dentate .. .. . | 6. <i>M. indica</i> . |
|------------------------------------|-----------------------|

1. *MÆSA MACROTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub reaching 30 to 50 feet in length; branches brown, somewhat angled and flexuose, striate. *Leaves* entire, chartaceous; elliptic, shortly bluntly acuminate at apex, rounded at base; smooth and dull on both surfaces; 3 to 4 in. long, 1·5 to 2 in. broad; midrib prominent, impressed above; main-nerves 5 to 7 pairs, distant, starting from the midrib at about 60° and curving upwards; secondary nerves and reticulations indistinct; petiole ·5 to ·7 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a large leafy terminal many-flowered tripinnate panicle, the branches rusty pubescent; pedicels about ·025 in. long, supported by a slightly shorter ovate-acute bract, and bearing 2 similar bracteoles below the flowers. *Calyx* superior, cupular; lobes 4, occasionally 5, rounded, denticulate, ·04 in. long, gland-dotted; tube very short. *Corolla* dull white or pink, longer than calyx; tube as long as lobes; lobes 4 or 5, rounded, often with

small lobules between, denticulate, with about 3 to 4 glandular lineoles. *Stamens* inserted near the base of the corolla-tube; anthers globose; filaments about twice as long as anthers. *Ovary* rounded, depressed, crowned with a short cylindric style and obtusely 3-4-lobed stigma. *Fruit* very small, .05 in. in diam., globose, glabrous, faintly striate, crowned about one-third of the way down with the persistent calyx-teeth. *Seeds* very minute, angled. Scheff. Myrs. 29; Mez Monog. Myrs. 49. *M. floribunda*, Scheff. Myrs. 18. *M. Korthalsiana*, Scheff. Myrs. 18 (?)

PERAK: Wray 2684; Scortechini 122, 1655; King's Collector 725, 2722, 3777, 4968, 5326.—DISTRIB. Sumatra, Korthals, Beccari 887; Borneo, de Vriese, Teysmann.

We have always found the flowers tetramerous, as described by Miquel and Scheffer. Mez describes them as either 4- or 5-merous. This is a well-marked species on account of its large terminal inflorescence, whose pubescent branches easily distinguish it from those occasional forms of *M. ramentacea* which have part of the inflorescence pseudo-terminal.

2. *MÆSA RAMENTACEA*, Wall, in Roxb. Fl. Ind. ed. Carey & Wall. II. 231 (1824). A large shrub or small tree, usually branched from the base and sending out many straggling or climbing branches often 30 to 40 feet long or more; branchlets smooth, somewhat striate when dry. *Leaves* entire, chartaceous; ovate-lanceolate or elliptic, acuminate at apex, rounded or cordate at base; 3 to 8 in. long, 1.5 to 4 in. broad; smooth on both surfaces and generally shining above; midrib prominent, often impressed above; main-nerves slender, distant, 5 to 10 pairs, starting at 45° with the midrib and curved upwards; secondary nerves and reticulations not apparent: petiole .3 to .5 in. long, slightly winged by the decurrent margins of the blade, which are often connivent above. *Inflorescence* axillary or sometimes pseudo-terminal, glabrous, many-flowered, consisting of more or less closely packed racemes arranged in bipinnate panicles, shorter or longer than the leaves; pedicels .1 to .15 in. long, slender, supported by a minute lanceolate bract and with 2 very minute ovate-lanceolate bracteoles below the flower; buds minute, globose, depressed at top. *Calyx* superior, cupular; tube very short, about .025 in. long; lobes 5, ovate, faintly ciliate, as long as the tube. *Corolla* .075 in. long; lobes half the length, ovate or ovate-reniform, edges undulate, with a few brown glandular lineoles. *Stamens* short, longer in ♀ flowers, inserted a little below the top of the tube; anthers rounded, filaments as long as the anthers, dorsifixed. *Ovary* in ♀ flowers adnate to the base of the calyx-tube, style short, stigma minutely 4-lobed, ovules many. *Fruit* globose, .1 to .15 in. long, crowned with the persistent teeth of the calyx; seeds minute, angled,

albuminous, embryo small, transverse. A. DC. in Trans. Linn. Soc. XVII. 133, Prod. VIII. 77; Scheff. Myrs. 15; Miq. Fl. Ind. Bat. II. 1006; Kurz in Journ. As. Soc. Beng. XLVI. ii. 220; For. Fl. II. 99; Clarke in Hook. f. Fl. Br. Ind. III. 508; Koord. & Val. Bijdr. V. 218; Mez Monog. Myrs. 27; Prain Beng. Pl. 642. *M. ovata*, A. DC. l.c. 133, t. 4, Prod. l.c. 77; Scheff. Myrs. 14. *M. lanceolata*, Don Prod. 148. *M. acuminata*, *missionis*, and *glabra*, DC. Prod. l.c. 77, 78, 82. *M. sumatrana*, Scheff. Myrs. 15. *Bæobotrys ramentacea*, Roxb. Hort. Beng. 16, Fl. Ind. I. 558; Wall. Cat. 2322. *B. ovata*, Wall. Cat. 2324. *B. glabra*, Roxb. Fl. Ind. I. 560. *B. fragrans*, Wall. Cat. 2323. *B. (?) missionis*, Wall. Cat. 6523.

KEDAH: Langkawi, Curtis 2554, 3409. PENANG: Wallich 2324; Maingay (K.D.) 1001; J. Scott; G. King; Phillips; Deschamps. PERAK: Scortechini 382A, 606B, 628; Wray 1286, 1291, 1912, 2363, 2787; King's Collector 171, 1222, 1909, 2788, 3883, 4144, 4281, 4497, 4915, 5088, 5113; Curtis. PAHANG: Ridley 2175. SELANGOR: Ridley; Goodenough 10554. NEGRI SEMBILAN: Ridley 10067. MALACCA: Griffith (K.D.) 3552; Cuming 2286; Miller 9; Hervey; Goodenough 1036, 1742; Derry 37, 1063; Ridley 10099. JOHORE: Lake & Kelsall 4035; G. King. SINGAPORE: Schomburgk 91; Lobb 324; T. Anderson 126; Ridley 2064, 2805; Goodenough 1644; Hullett 38, 56, 885, 887.—DISTRIB. Eastern Bengal and Burma, Andaman and Nicobar Islands, Sumatra, Java, Borneo.

We follow Mez in not keeping up the var. *ovata*. The large mass of material available shows clearly that in shape of leaf and in inflorescence the variation is regular, and that the form with cordate long-acuminate leaves passes gradually into that with ovate broad short-acuminate leaves, and that similarly the inflorescence changes. A monstrous form with moss-like inflorescence similar to those often seen in India on *M. Chisia* and other species, is not uncommon.

3. *MÆSA IMPRESSINERVIS*, King & Gamble, n. sp. A bush or small tree; branches half as thick as a goosequill, glabrous, pale brown, and prominently longitudinally wrinkled when dry. Leaves thinly coriaceous; elliptic, shortly acuminate at apex, cuneate at base; entire or very faintly dentate only near the apex, margins recurved when dry, reticulate and shining above, dull and paler beneath; 3 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent, impressed above; main-nerves 7 or 8 pairs, also prominently impressed above and prominently raised on the lower surface, arching upwards to meet near the margin; secondary nerves few, inconspicuous as are the reticulations; petiole .2 to .25 in. long, bordered by the decurrent edges of the blade, which are almost connivent above. Inflorescence an axillary raceme, simple or with one short branch near the base, 1.5 to 2.5 in. long, and so shorter

than the leaves; pedicels slender, .1 in. long, with a .06 in. long subulate bract at the base and 2 similar bracteoles beneath the flower; buds nearly globose. *Calyx* superior, .05 in. in depth, cupular, with 5 imbricate broad incurved concave glabrous lobes. *Corolla* rotate with 5 imbricate rounded broad lobes, .1 in. deep; tube rather longer than lobes. *Stamens* 5, inserted on the base of the corolla; anthers globular; filaments flattened, longer than the anthers. *Ovary* inferior, depressed, surmounted by a flattened lobed stigma, 1-celled; ovules many, cuneate, on a central basal placenta. *Fruit* unknown.

PERAK: Gunong Bubu, at 5,000 feet elevation; Wray 3850, 3886.

4. *MESA STRIATA*, Mez Monog. Myrs. 42 (1901). A shrub or small tree; branches smooth, reddish, with scattered lenticels. *Leaves* membranous; rather variable, elliptic or elliptic-oblong, rounded or acuminate at apex, bluntly acute and sometimes unequal at base; entire or undulate or broadly dentate, especially on the upper half, pale green when dry, glabrous except for a few occasional stiff hairs on the midrib beneath, striate with many faint very slender lineoles; 4 to 7 in. long, 2.5 to 3 in. broad; midrib angular, prominent beneath, main-nerves 7 to 8 pairs, slender; secondary nerves and reticulations faint and irregular; petiole slender, .4 to 1 in. long, channelled above. *Inflorescence* of axillary racemes, simple or joined in a sub-sessile panicle, rarely\* over 2 in. long; pedicels very slender, .05 to .1 in. long, with a subulate bract at base, half their length, and 2 acute bracteoles under the flower. *Calyx* superior, about .1 in. deep; lobes 5, imbricate, ovate, rounded, about 4-striate, edges hyaline; tube as long as lobes. *Corolla* as long as calyx, rotate, .1 in. in depth; lobes 5, imbricate, rounded, crenate, glabrous. *Stamens* 5, inserted near the base of the corolla; anthers ovate, slightly divaricate; filaments 2 to 3 times as long as anthers. *Ovary* inferior, depressed, rounded; style short cylindrical, stigma 4-lobed; ovules many, cuneate, on a central basal placenta. *Fruit* round, .1 to .15 in. in diam., smooth, faintly ribbed, crowned by the persistent calyx-lobes and style.

PENANG: at Paya Trobong, Curtis 2857. PERAK: *King's Collector* 2287.—DISTRIB. Sumatra, *Forbes* 1260, 1287, 1315, 1376.

5. *MESA PAHANGIANA*, King & Gamble, n. sp. Apparently a shrub; branches round, smooth, dark brown when dry. *Leaves* membranous; rhomboid-obovate, acuminate at the apex, rounded cuneate at base; faintly crenate especially in the upper half; glabrous on both dull surfaces; 7 to 8 in. long, 4 to 4.5 in. broad; midrib slender, prominent beneath; main-nerves distant, 8 to 9 pairs, at about half a right angle with the midrib, sometimes branched; secondary nerves few and like the reticulations indistinct; petiole slender, .8 to 1 in. long. *Inflores-*



cence a simple axillary raceme, as long as or slightly longer than the petiole; pedicels slender, about .1 in. long, supported by a minute subulate bract below and with two similar bracteoles below the flower. *Calyx* superior, cupular, with a very short tube and 5 triangular imbricate teeth .6 in. long, glabrous, hyaline at the edges and very faintly brown-glandular. *Corolla* as long as calyx; lobes 5 imbricate, glabrous, rounded, somewhat crenate, with 2 to 3 prominent brown glandular lineoles; tube half the length. *Stamens* nearly as long as corolla, inserted near its base; filaments about twice as long as the anthers; anthers emarginate, cells somewhat divaricate. *Fruit* globose with a conical tip surrounded by the remains of the corolla and the persistent calyx, and surmounted by the short persistent style, ribbed, .125 in. in diam., glabrous.

PAHANG: at Tanjong Antan, Ridley 2175A.

Only one specimen is unfortunately available, and that in fruit, with only remains of flowers.

6. *MÆSA INDICA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 230 (1824). A shrub reaching 4 to 6 feet in height; branchlets brown, smooth, lenticellate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate, rounded or acute at the base; repand-dentate, about 3 teeth to each main-nerve; 3 to 7 in. long, 2 to 3 in. broad; midrib very prominent, often broad; main-nerves 8 to 12 pairs, others closely reticulate; glandular striæ long, prominent; petiole .5 to 1 in. long, channelled above by the decurrent bases of the blade. *Inflorescence* of simple or compound axillary racemes, much shorter than the leaves, usually 1 to 3 in. long; pedicels slender, .05 to 1 in. long, longer in fruit; bracts subulate, in flower as long as pedicels; bracteoles 2, minute. *Calyx* superior, with 5 imbricate lobes, which are ovate, ciliate, striate, about .04 in. long, almost acute or rounded at apex. *Corolla* as long as calyx; lobes denticulate, glandular-striate; tube as long as lobes. *Stamens* inserted at base of corolla-tube; anthers ovate, cells divaricate; filaments dorsifixed, rather longer than anthers. *Ovary* rounded; style short cylindric, stigma obtuse; ovules many. *Fruit* round, smooth, striate, .15 in. long, crowned at the summit by the persistent calyx-lobes and the remains of the stigma. *Seeds* angular. A. DC. in Trans. Linn. Soc. XVII. 134, Prod. VIII. 80 (*in part*); Wall. Cat. 2318 E.; Clarke in Hook. f. Fl. Br. Ind. III. 509 (*in part*); Koord. & Val. Bijl. V. 222; Mez Monog. Myrs. 29. *Bæobotrys indica*, Roxb. Hort. Beng. 16, Fl. Ind. I. 557.

PERAK: Wray 3314, 3349; Scortechini 16, 733; Ridley 3007, 9741; King's Collector 7712.—DISTRIB. Burma, Java.

## 2, MYRSINE, Linn.

Trees or shrubs. *Leaves* entire or serrate, often thick, usually pellucid-punctate. *Flowers* polygamous or dioecious, fascicled, axillary or on very short branches, pedicels short with many imbricate bracts. *Calyx* small, lobes 4 to 5 persistent. *Corolla* 4-5-lobed, the lobes imbricate in bud, recurved in flower. *Stamens* 4 to 5; filaments short, inserted at the base of the corolla-lobes; anthers short, ovate; staminodes none. *Ovary* free, globose or ovoid; style usually short, cylindric or angular; stigma capitate or 2-5-lobed; ovules few or many, immersed in the placenta. *Fruit* a small, dry or somewhat fleshy, berry, 1-seeded. *Seed* solitary, globose, sessile, hollowed at the base; albumen pitted; embryo elongate, cylindric or curved, horizontal.—DISTRIB. Species about 80, chiefly tropical, a few in Japan, extra-tropical Africa, Australia and New Zealand. All our species belong to Mez' genus *Rapanea*.

Arrested branches bearing the umbels very short, .1 in. long or under:—

- |                                                                     |                           |
|---------------------------------------------------------------------|---------------------------|
| Leaf-nerves and reticulations obscure, leaves small, under 2.5 in.  | 1. <i>M. avenis</i> .     |
| Leaf-nerves and reticulations visible, leaves usually over 2.5 in:— |                           |
| Leaves under 4 in. long, chartaceous, blackish when dry;            |                           |
| pedicels short, .1 in. long .. .. .                                 | 2. <i>M. Porteriana</i> . |
| Leaves over 4 in. long, coriaceous, reddish when dry; pedicels      |                           |
| over .15 in. long .. .. .                                           | 3. <i>M. perakensis</i> . |

Arrested branches bearing the umbels .3 in. long or more:—

- |                                                     |                            |
|-----------------------------------------------------|----------------------------|
| Leaves rounded at apex; berry .2 in. in diam. ..    | 4. <i>M. Wrayi</i> .       |
| Leaves emarginate at apex; berry .3 in. in diam. .. | 5. <i>M. umbellulata</i> . |

1. MYRSINE AVENIS, A. DC. in Trans. Linn. Soc. XVII. 107 (1834). A small tree; branches pale, rounded; branchlets wrinkled when dry, faintly ferruginous-tomentose, leaf-buds long acuminate. *Leaves* entire, chartaceous; oblong-lanceolate, bluntly acute at apex, acutely narrowed at base, glabrous, marked with resinous often very conspicuous lineoles and dots along the margin especially near the apex, margins usually recurved; 1 to 2.5 in. long, .5 to .75 in. broad; mid-rib prominent, impressed above; main-nerves very obscure as are the reticulations; petiole .2 in. long, slender, edged with the ciliate margins of the decurrent blade. *Flowers* in compact sessile 2-5-flowered umbels on very short thick arrested branches; bracts oblong acute; pedicels about .1 in. long, angular; flower-buds ovate, flowers 5-merous. *Calyx-lobes* triangular, acute, ciliate, with few round glandular dots; tube as long as lobes. *Corolla-lobes* imbricate, elliptic, pubescent on the margins, sparsely round-gland-dotted, connate for about one-third of their length. *Stamens* as long as corolla-lobes; anthers

ovate, apiculate, pubescent at tip; filaments and lower part of anthers attached about half-way up the corolla-lobes. *Ovary* rounded, conical; style short in ♂, oblique and with long channelled stigma in ♀. *Berry* globose, .1 in. in diam., glandular, smooth, tipped with the persistent style. DC. Prod. VIII. 96; Miq. Pl. Jungh. 189, and Fl. Ind. Bat. II. 1015; Scheff. Myrs. 47; Koord. & Val. Bijdr. V. 234. *Myrsine capitellata*, Wall. var. *avenis* Clarke in Hook. f. Fl. Br. Ind. III. 512 (*in part*); Stapf in Trans. Linn. Soc. Ser. 2, IV. 199. *Ardisia avenis*, Blume Bijdr. 691. *Rapanea avenis*, Mez Monog. Myrs. 357.

SINGAPORE: *Ridley* 253.—DISTRIB. Java, Celebes, Borneo.

2. *MYRSINE PORTERIANA*, Wall. Cat. 6525 (1829). A shrub or small tree; branches grey, rough; branchlets slender, angled when dry, leaf-buds lanceolate. *Leaves* chartaceous, entire; oblong-lanceolate, bluntly acute and slightly emarginate at apex, cuneately narrowed at base, glabrous, glandular dotted, especially along the margin, and often glandular-lineolate, black or greyish when dry; 1.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 12 pairs, the lowest pair running parallel to the midrib and there joined by the rest, not always easily seen; secondary nerves few, slender, reticulations minute; petiole slender, .2 to .4 in. long, channelled above by the decurrent and almost connivent, slightly fimbriate, edges of the blade. *Flowers* in compact sessile umbels on the summit of a short thick cone-like bracteate arrested branch about .1 to .3 in. long; bracts ovate, bracteoles oblong, blunt, ciliate; pedicels angled .1 in. long; flower-buds ovate, flowers greenish-white, usually dioecious, 5-merous. *Calyx-lobes* ovate acute, .05 in. long, ciliate, marked with prominent dark round or lineolate glands; tube as long as lobes. *Corolla-lobes* oblong obtuse, .1 to .15 in. long, minutely pubescent on the margins, marked by prominent dark rounded and lineolate glands, connate to one-fourth of their length, revolute in flower. *Stamens* inserted on the corolla, the filaments and lower half of the anthers adnate with it, those of ♂ flowers ovate apiculate, those of ♀ flowers sagittate; in open flowers exsert, longer than the revolute lobes. *Ovary* ovoid, glabrous, ♂ flowers with a short straight style, ♀ flowers with an oblique style and oblique folded stigma. *Berry* globose, glabrous, .1 in. in diam., dark blue when fresh, pale when dry, striate from the elongated vertical glands. A. DC. in Trans. Linn. Soc. XVII. 106, Prod. VIII. 95. *M. capitellata* var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (*in part*). *Rapanea Porteriana*, Mez Monog. Myrs. 358.

PENANG: *Porter* in *Wallich* 6525; *Maingay* (K.D.) 1005; *Curtis* 1013, 3728, on Government Hill, road to Crag. PERAK: *Ridley* 2992; *Wray* 678, 1537; *King's Collector* 5001, usually at 5,000 feet eleva-

tion. PAHANG: *Ridley* 1669A. SELANGOR: *Ridley* 8208. MALACCA: *Griffith* (K.D.) 3543; *Ridley* 10076, on Mount Ophir.

3. *MYRSINE PERAKENSIS*, King & Gamble, n. sp. A tree; branchlets thick, smooth, wrinkled when dry, terminal leaf-buds lanceolate. *Leaves* entire, coriaceous; oblong, bluntly acute at apex, narrowed at the base, glabrous, shining above, margins recurved, glandular dots many, inconspicuous; 4 to 5 in. long, 1.5 to 2 in. broad; midrib thick, very prominent; main-nerves 20 to 26 pairs, prominent above, at about two-thirds of a right angle with the midrib, parallel at first, arching afterwards to meet near the margin; secondary nerves similar but more slender, reticulations prominent; petiole .3 in. long, very thick, winged by the decurrent margins of the blade. *Flowers* in compact sessile umbels on the summit of a thick, cone-like, bracteate, arrested branch about .1 in. long, in the axils of the leaves or below them on the current year's wood, so forming a thick cluster below the terminal leaves: umbels 5-8-flowered, pedicels .15 to .2 in. long, thick and angular when dry; bracts ovate, scaly, sometimes ciliate. *Calyx-lobes* ovate acute, glandular-ciliate, about .05 in. long, ciliæ jointed. *Corolla* and *Stamens* unknown. *Berry* globose, sometimes conical at top, .1 to .15 in. in diam., pericarp pale brown when dry, striate with obscure oblong glands.

PERAK: *Wray* 3856; *Scortechini*, 766, at 5,000 feet elevation.

4. *MYRSINE WRAYI*, King & Gamble, n. sp. A tree; branchlets stout, striate when dry. *Leaves* entire, coriaceous; elliptic-oblong, rounded at the apex, narrowly cuneate at base; 3 to 5 in. long, 1 to 1.75 in. broad, glabrous; midrib slender; main-nerves very obscure, about 12 pairs, meeting in an intramarginal nerve near the edge, reticulations many, somewhat raised beneath when dry; petiole .5 to .7 in. long, bordered above by the decurrent margins of the blade, wrinkled at the base. *Flowers* in peduncled axillary few-rayed umbels; bracteoles minute, triangular; peduncles .3 to .5 in. long; rays of umbel 3 to 4, pedicels about .35 in. long, clavately thickened above. *Calyx-lobes* triangular-ovate, glandular-ciliate, acute, .05 in. long. *Corolla* and *Stamens* unknown. *Fruit* round, .2 in. in diam., crowned by the persistent base of the style; pericarp rugosely striate.

PERAK: *Wray* 232, at 4,500 feet.

5. *MYRSINE UMBELLULATA*, A. DC. in Trans. Linn. Soc. XVII. 135 (1834). A small tree; branchlets thick, glabrous, reddish-brown. *Leaves* entire, coriaceous; elliptic-obovate, obtuse and emarginate at apex, acute at the base; glabrous above, rusty beneath, black glandular dots frequent, margins often recurved; 2 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent, slender; main-nerves inconspicuous, slender, raised on upper surface, depressed on lower, reticulations obscure;

petiole .3 to .5 in. long, rugose, bordered above by the decurrent margins of the blade. *Flowers* in axillary scattered umbels on thick cone-like bracteate arrested branches, about .15 in. long; pedicels very slender, .3 to .4 in. long, glabrous. *Calyx-lobes* ovate, acute, very shortly ciliate, minute, recurved in fruit. *Corolla* and *Stamens* unknown. *Berry* globose, .3 in. in diam., smooth, pale when dry, crowned with the persistent style. A. DC. Prod. VIII. 95; Miq. Fl. Ind. Bat. II. 1014. *M. capitellata*, var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (in part). *Embelia umbellulata*, Wall. Cat. 2312. *Rapanea umbellulata*, Mez Monog. Myrs. 362.

SINGAPORE: Wallich 2312.—DISTRIB. Sumatra, Borneo.

### 3. EMBELIA, Burm.

Small trees or shrubs, usually climbing, often extensively. *Leaves* alternate, entire, dentate or serrulate, usually glandular, petiole often margined. *Flowers* in axillary or terminal racemes, simple or paniculate, white or pink, hermaphrodite or polygamo-dioecious. *Calyx* free, 4–5-lobed, persistent, the lobes rounded or ovate. *Corolla* 4–5-lobed, the lobes imbricate or contorted, tube none or short. *Stamens* 4 to 5; filaments short or elongate, inserted on the corolla; anthers ovate-oblong, obtuse or acute; staminodes none. *Ovary* ovoid, globose or conical; style short; stigma capitate; ovules few, inserted on a subglobose placenta. *Fruit* a small drupe, globose, 1-seeded, crowned by the persistent style. *Seed* ovoid, hollowed at the base, albumen pitted, embryo transverse, curved.—DISTRIB. About 60 species, in the tropical regions of the Old World.

Inflorescence terminal or terminal and axillary, paniculate:—

Petals free (Sect. I. EUEMBELIA):—

Leaves membranous or chartaceous:—

Main-nerves of leaves slender, not prominent:—

Petals sparingly villous, anthers with a cluster of black warts behind .. .. . 1. *E. Ribes*.

Petals densely villous, anthers with only small glandular warts behind:—

Leaves elliptic, 1.5 to 2 in. broad, shortly acuminate.. 2. *E. canescens*.

Leaves oblong, .75 in. broad, long but obtusely acuminate 3. *E. dasythyrsa*.

Main-nerves of leaves prominent:—

Branches slender, leaves lanceolate acuminate, flowers densely villous .. .. . 4. *E. Scortechinii*.

Branches stout, leaves suddenly acuminate, flowers glabrous or slightly pubescent only .. .. . 5. *E. penangiana*.

Leaves coriaceous:—

Panicles long, leaves moderately thick:—

Leaves acute or cuneate at base, main-nerves conspicuous, bracteoles as long as the pedicels .. .. . 6. *E. pergamacea*.

- Leaves rounded or cordate at base, main-nerves very prominent, bracteoles shorter than the pedicels .. .. 7. *E. coriacea*.  
 Panicles short, stout, leaves very thick .. .. 8. *E. angulosa*.  
 Petals joined at the base into a tube (Sect. II. *GRENACHERIA*):—  
 Leaves rusty-villous beneath, bracts of the inflorescence short, inconspicuous .. .. 9. *E. Lampani*.  
 Leaves pubescent or nearly glabrous beneath, bracts of the inflorescence long, often leafy, conspicuous .. .. 10. *E. amentacea*.  
 Inflorescence axillary:—  
 Inflorescence paniculate, axillary, 1 to 2 in. long (Sect. III. *PATTARA*) .. .. 11. *E. Ridleyi*.  
 Inflorescence much shorter than the leaves, on very short racemose branchlets with many bracts (Sect. IV. *MICREMBELIA*):—  
 Flowers tetramerous, leaves coriaceous .. .. 12. *E. Myrtilus*.  
 Flowers pentamerous, leaves chartaceous .. .. 13. *E. parviflora*.  
 SPECIES IMPERFECTLY KNOWN: 14. *E. lucida*. 15. *E. macrocarpa*.

1. *EMBELIA RIBES*, Burm. Fl. Ind. 62. t. 23 (1768). An evergreen climbing shrub; branches pale brown, with thick bark studded with conical protuberances; branchlets pale brown, smooth, lenticellate. *Leaves* entire, chartaceous; elliptic or elliptic-lanceolate, obtusely acuminate at apex, cuneate at base; glabrous above, glabrous or minutely pubescent beneath, glandular dots scattered, sometimes obscure; margin generally recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, prominent below, generally impressed above; main-nerves obscure, irregular, slender, 12 to 14 pairs, parallel at first then curved upwards to join near the margin; secondary nerves many faint, reticulations very obscure; petiole .3 to .5 in. long, bordered by the crisped edges of the decurrent blade. *Inflorescence* a large terminal leafy 3-pinnate grey- or rusty-pubescent panicle of racemes, the branches at first turning upwards, afterwards nearly at right angles with the rachis; bracts leafy, smaller by degrees upwards; bracteoles subulate, shorter than the slender pedicels, .05 in. long; buds small, globose; flowers white. *Calyx-lobes* very minute, about .025 in. long, triangular-acute, ciliate, with few glandular dots; tube as long as lobes. *Corolla-lobes* free, elliptic, rounded at top in ♀, more acute in ♂, .05 in. long, ciliate, sparingly villous-pubescent, apex incurved, with few prominent glandular dots. *Stamens* inserted on the corolla-lobes, about half-way up in ♂, lower down in ♀, shorter than the lobes; anthers short, ♂ with parallel, ♀ with divaricate, cells, both with a long black mass of glandular warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous; style short, stigma capitate in ♂, peltate and larger in ♀. *Berry* globose or sometimes pyriform, red or black, glabrous, succulent, wrinkled when dry, aromatic, .1 to .15 in. in diam., crowned with the persistent style and

stigma. Retz. Obs. iv. 24; Lamk. Ill. t. 133; Roxb. Fl. Ind. i. 586; Wall. Cat. 2304; A. DC. in Trans. Linn. Soc. XVII. 129, Prod. VIII. 85 (part); Scheff. Myrs. 38; Miq. Fl. Ind. Bat. II. 1011; Dalz. & Gibs. Bomb. Fl. 137; Brandis For. Fl. 284; Kurz For. Fl. II. 101; Clarke in Hook. f. Fl. Br. Ind. II. 513; Trimen Fl. Ceyl. III. 69; Cooke Bomb. Fl. II. 84; Mez Monog. Myrs. 303; Prain Beng. Pl. 643. *E. Burmannii*, Retz Obs. IV. 23. *E. garciniaefolia*, Wall. Cat. 2304c and e; Miq. l.c. 1011; Scheff. Myrs. 40. *E. sumatrana*, Miq. l.c. 1012. *E. glandulifera*, Wight Ic. 1207; Dalz. & Gibs. Bomb. Fl. 137. *Samara Ribes*, Kurz in Journ. As. Soc. Beng. XLVI. 222. *Ardisia tenuiflora*, Bl. Bijdr. 687.

PENANG: *Deschamps, Curtis*. PERAK: *Wray* 420; *Scortechini; King's Collector* 928, 1150, 6999 (abnormal state, most of the flowers converted into leafy bracts). MALACCA: *Griffith* (K.D.) 3550; MAINGAY (K.D.) 1002; *Cuning* 2320. JOHORE: *Native Collector* 3749. SINGAPORE: *Ridley* 10643, 2803 (fruits converted into insect galls); *Kurz* 2965.—DISTRIB. India, Burma and Ceylon; Malay Islands and eastwards to South China.

VAR. *rugosa*, King & Gamble. Branchlets dark brown, much wrinkled and with oblong lenticels. *Leaves* 4 to 5 in. long, 1.5 to 2 in. broad, usually thicker than the type. *Racemes* less pubescent than in type, the flowers often collected near the ends of the ultimate branches of the inflorescence. *Stamens* of ♂ flowers exsert. *Stigma* of ♀ much larger than that of ♂ flowers, peltate. *Berry* rugose, conically tipped; pericarp thick, fleshy, with cavities.

PERAK: *Wray* 2278, 2576, 3069; *King's Collector* 2512, 3001, 4040. SINGAPORE: *Ridley* 10384.

We find no Malay specimens with the large glandular pits so well marked in South Indian specimens (*Embelia glandulifera*, Wight Ic. 1207). Wight's figure is not well drawn in several respects, and especially as to the nervation of the leaves, so it is not very easy to make sure about it, but there seems no reason to separate *E. glandulifera* from *E. Ribes* unless perhaps as a variety. It has usually a much shorter and fewer-flowered inflorescence.

2. *EMBELIA CANESCENS*, Jack; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 292 (1824). A climbing shrub with slender, villous, subflexuose branches. *Leaves* entire, chartaceo-membranous; elliptic, shortly acuminate at apex, rounded or sub-cordate at base, glabrous or slightly pubescent and shining above, canescent beneath; glandular dots many, not prominent, in the areoles of the reticulations; 2 to 3.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above, villous beneath; main-nerves about 10 pairs, irregular, curving upwards to join at some distance from the margin; secondary nerves many, slender,

reticulations irregular; petiole .3 to .4 in. long, bordered above by the prominently crispate edges of the decurrent blade, rugose beneath. *Inflorescence* a slender terminal 3-pinnate leafy panicle of distant comparatively few-flowered racemes, 4 to 8 in. long; rachis and its branches densely rusty-villous; bracts leafy below, spatulate above, bracteoles subulate, deciduous, about half as long as the .05 to .1 in. long pedicels which are longer in fruit; buds very minute, globose. *Calyx-lobes* very small, triangular, pubescent; tube as long as lobes. *Corolla-lobes* oblong, free, blunt, .06 in. long, densely villous without, papillose within and glandular-dotted. *Stamens* shorter than the corolla-lobes, inserted near their base; anthers rounded, warted with inconspicuous glands behind at the insertion of the dorsifixed filaments. *Ovary* in ♂ flower rudimentary. *Berry* globose, somewhat conical above, rugose when dry, crowned with the remains of the persistent style, .2 in. in diam. Wall. Cat. 2311; A. DC. Prod. VIII. 85; Scheff. Myrs. 42; Miq. Fl. Ind. Bat. II. 1012; Clarke in Hook. f. Fl. Br. Ind. III. 514; Mez Monog. Myrs. 305.

PENANG: Jack; Porter. PERAK: Ridley 7172 (part). MALACCA: Maingay (K.D.) 1004. SINGAPORE: Goodenough 2804; Hullett 115.

3. *EMBELIA DASYTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub; branches minutely pubescent, striate, with prominent raised lenticels; branchlets dark, slender, rusty-villous. *Leaves* entire, chartaceous; oblong or elliptic-oblong, bluntly acuminate at apex, rounded at base; glabrous above, glabrous except on the midrib beneath, glandular dots scattered, obscure; 1.5 to 2 in. long, about .75 in. broad; midrib prominent beneath, villous, impressed above, main-nerves 10 to 12 pairs, irregular, arching upwards to meet near the margin; secondary nerves few, slender, reticulations obscure; petiole .1 to .2 in. long, channelled above. *Inflorescence* a long, 3-pinnate, leafy panicle of long slender many-flowered racemes, rachises minutely pubescent; bracts leafy, bracteoles subulate, minute, much shorter than the .1 in. long very slender pedicels; buds globose shaggy, flowers grey. *Calyx-lobes* minute, about .03 in. long, triangular, ciliate; tube shorter than lobes. *Corolla-lobes* free, ovate-spatulate, about .06 in. long, black-gland-dotted, densely covered with short moniliform hairs. *Stamens* less than half the length of the corolla-lobes, inserted at the base; anthers reniform, with inconspicuous glandular warts on the back at the insertion of the dorsifixed filaments, which are almost shorter than the anthers. *Ovary* ovoid, style very short, stigma in ♂ small capitate, in ♀ peltate, large. *Berry* red or black, .15 in. in diam., globose or slightly pyriform, wrinkled when dry, tipped by the persistent style and stigma. Scheff. Myrs. 42; Mez Monog. Myrs. 305.



PERAK: Wray 1924; *Scortechini* 498; *King's Collector* 776, 4103, 4375, 5102, 5762, 6640, 8583, 10024, 10701, clinging to trees in dense jungle at low levels. SELANGOR: *Ridley* 7572. SINGAPORE: *Hullett* 118.—DISTRIB. Bangka, *Teysmann* Hort. Bogor. No. 3189, at Djeboes.

Only one very poor specimen of the type (*Teysmann's*) is available, but from an examination of it and from *Miquel's* description it seems to be right to refer the Peninsular plant, which we had considered new, to this species.

4. *EMBELIA SCORTECHINII*, King & Gamble, n. sp. A climbing shrub (?); branches slender; ultimate branchlets reddish, rusty-villous. *Leaves* entire, chartaceous; elliptic-lanceolate, long acuminate at apex, narrowed at base; glabrous above, grey-pubescent on the nerves beneath and with minute white scales, glandular dots obscure; 4 to 5 in. long, 1.5 to 2 in. broad; midrib very prominent, impressed above; main-nerves about 8 pairs, prominent, slender, curving upwards to and along the margin; reticulations many, prominent on the upper surface; petiole .2 in. long, pubescent. *Inflorescence* of slender rusty-villous panicles of long racemes, the panicles 7 to 10 in. long, racemes 3 to 6 in.; rachis hirsute, somewhat angular; bracts deciduous, bracteoles very minute, subulate; buds very small, globose. *Calyx-lobes* ovate, rounded, very minute, the edges ciliate with long moniliform hairs, tube very short. *Corolla-lobes* oblong, acute, .05 in. long, shaggy with long moniliform hairs. *Stamens* shorter than the corolla-lobes; anthers ovate, cordate, with two prominent papillose warts behind at the insertion of the dorsifixed very short filaments. *Ovary* ovoid, style conical. *Berry* not known.

PERAK: *Scortechini*.

This interesting species is characterised by the abundant moniliform hairs on the flowers, longer and more conspicuous than in other species.

5. *EMBELIA PENANGIANA*, Mez Monog. Myrs. 311 (1901). A climbing shrub, stem reaching about 1 in. in diam.; branches stout; ultimate branchlets red, striate, lenticellate. *Leaves* entire, chartaceous; elliptic, shortly acuminate at apex, narrowly cuneate at base; glabrous, not gland-dotted; 3.5 to 4.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above; main-nerves 10 to 12 pairs, irregular, slender, at about two-thirds of a right angle with the midrib at first then arching upwards to join near the margin; secondary nerves similar but less prominent, reticulations many; petiole .5 in. long, slender, edged by the crispate decurrent margins of the blade which are often connivent above. *Inflorescence* a terminal 3-pinnate leafy panicle, 6 to 9 in. long, of slender racemes; rachis slightly pubescent, main branches at about half a right angle with rachis; peduncles about 1 in. long, upper branches and branchlets usually at right angles; bracts lanceolate spathulate, leafy, deciduous;

bracteoles subulate, as long as or rather longer than the very short, under .05 in. long pedicels; buds very small, globose, flowers red. *Calyx-lobes* orbicular, glandular-ciliate, .05 in. long, connate to the middle, not gland-dotted. *Corolla-lobes* 5, free, ovate, rounded at apex, .075 to .1 in. long, slightly pubescent without, papillose within, not gland-dotted. *Stamens* of ♂ flowers equal to or longer than the corolla-lobes, of ♀ flowers shorter than them, inserted near the base of the lobes; anthers oblong, emarginate, with minute black warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous, style very short, stigma peltate. *Berry* globose, red, tuberculate and corrugate, .1 in. in diam., fruiting pedicels as long as berry. *Embelia Ribes* var. *penangiana*, Oliv. in Hook. Ic. Pl. t. 1597.

PENANG: *Curtis* 306. PERAK: *Wray* 1375, 1409; *Scortechini*; *King's Collector* 3637, 10739.

A well-marked species, distinguished by the fairly prominent nerves of the leaves, the very short pedicels, and the absence of glandular dots.

6. *EMBELIA PERGAMACEA*, A. DC. Prod. VIII. 85 (1844). A slender climbing shrub; branches rather thick, branchlets wrinkled and angular when dry. *Leaves* entire, coriaceous; oblong-lanceolate, acuminate at apex, cuneate or acute at base; glabrous, shining above, pale beneath, margins recurved, glandular dots many, hardly prominent; 3 to 5 in. long, 1.5 to 2 in. broad, midrib thick, impressed above; main-nerves slender 12 to 14 pairs, parallel but irregular, raised and conspicuous on the upper surface, leaving the midrib at about two-thirds of a right angle and joining near the edge in an intramarginal nerve; secondary nerves many, parallel to the main-nerves, reticulations obscure; petiole .3 in. long, angular, channelled above when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal, pyramidal, 4-pinnate, nearly glabrous, leafy panicle with racemose branchlets and very numerous flowers; main rachis thick, flattened above, branches nearly at right angles to rachis as again are the branchlets, all angular; bracts ovate spatulate, leafy, bracteoles subulate acuminate as long as the pedicels; pedicels .05 in. long, somewhat longer in fruit; buds very small, globose, flowers light red. *Calyx-lobes* minute, about .04 in. long, broadly triangular, acute, glandular-ciliate, papillose on both sides, dotted with few large and small brown and black glands, tube as long as lobes. *Corolla-lobes* free, ovate-oblong, glandular-ciliate, glabrous without, papillose within, dotted in upper part only, .07 in. long. *Stamens* as long as or shorter than corolla-lobes, inserted half-way up; anthers ovate cordate, emarginate, black-warted behind at the insertion of the dorsifixed filaments. *Ovary* glabrous, ovoid; style thick very

short; stigma capitate. *Berry* globose, blue when ripe, wrinkled when dry, .06 in. in diam., crowned with the persistent style, gland-dotted. Miq. Fl. Ind. Bat. II. 1012; Scheff. Myrs. 34; Mez Monog. Myrs. 310. *Ardisia pergamacea*, Bl. fide A. DC.

PERAK: Curtis 2029; Wray 2001; King's Collector 3658, 4678, 6412.—DISTRIB. Java; Borneo.

This species closely resembles *E. coriacea*, but differs in the acuminate leaves, very shining above and prominently nerved; in the papillose calyx-lobes, petals dotted only in the upper part and bracteoles as long as the pedicels.

7. *EMBELIA CORIACEA*, Wall. Cat. 2314 (1829). A climbing shrub; branches reaching 1.5 in. in diam.; branchlets reddish, twisted, somewhat angular, roughly lenticellate. *Leaves* entire, coriaceous; oblong or oblong-lanceolate, obtusely acute at apex, rounded or almost cordate or auricled at base; glabrous, more or less shining above, brownish beneath, glandular dots scattered, not prominent, margin sometimes incurved; 3 to 10 in. long, 1.5 to 4 in. broad; midrib thick, impressed above; main-nerves many, slender, not prominent, irregularly parallel, at about two-thirds of a right angle with the midrib, joining in an intramarginal faint nerve; secondary nerves many, slender, reticulations faint; petiole thick, .3 to .7 in. long, channelled when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal 4-pinnate spreading leafy rusty-pubescent panicle with racemose branchlets and very numerous flowers; main rachis thick, somewhat flattened, branches nearly at right angles to rachis as again are the branchlets; bracts leafy, decreasing upwards; bracteoles minute, subulate, about half the length of the pedicels; pedicels .05 in. long; buds very small, globose, flowers grey. *Calyx-lobes* 5, minute, triangular, glabrous, dotted with very few (3 to 5 per lobe) brown or black glands; tube as long as lobes. *Corolla-lobes* free, 4–5, ovate, blunt, recurved, glabrous without, slightly papillose within, gland-dotted all over. *Stamens* shorter than the corolla-lobes, inserted on them about half-way up; anther-cells oblong, somewhat divaricate, with about 4 black warts behind at the insertion of the short filaments. *Ovary* ovoid, style very short, stigma capitate. *Berry* globose, smooth, .075 to .1 in. in diam., pale, prominently gland-dotted, wrinkled when dry, crowned with the persistent base of the style. A. DC. in Trans. Linn. Soc. XVII. 135, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 513; Mez Monog. Myrs. 313. *E. oblongata*, Miq. Fl. Ind. Bat. Suppl. 573; Scheff. Myrs. 34. *E. macrophylla*, Bl.; Scheff. Myrs. 36.

PENANG: Wallich 2314; Curtis 1047. PERAK: Curtis 1307; Derry 11712; Wray 2001, 2579, 3238; Scortechini 117, 255; King's Collec-

tor 2278, 3481, 4976, 5056, 5254, 5323, 6231, 6766, 7857, 10015, 10543. PAHANG: *Ridley* 5828. SELANGOR: *Ridley* 7562. MALACCA: *Maingay* (K.D.) 1018; *Ridley* 11135. SINGAPORE: *Ridley* 2812.—DISTRIB. Sumatra; Java; Borneo, *Beccari* 767, 878, 1189, 2561, 3922; *Haviland & Hose* 3469.

8. *EMBELIA ANGULOSA*, King & Gamble, n. sp. A climbing shrub; branches thick, branchlets wrinkled when dry, lenticels few. *Leaves* entire, coriaceous; ovate, obtuse, emarginate, glabrous, shining above, dull beneath, glandular dots pitted on both surfaces; 2 to 3·5 in. long, 1 to 2 in. broad; midrib very thick and prominent, impressed above; main-nerves 14 to 16 pairs, slender, irregular, leaving the midrib at nearly a right angle, then curved and joining near the margin, raised on upper surface; secondary nerves many, slender, reticulations obscure; petiole ·2 in. long, channelled above and bordered by the crispate edges of the decurrent blade. *Inflorescence* a dense terminal glabrous stiff panicle about 4 in. long and broad, of racemes, the rachises sharply angled; bracts leaf-like, spathulate, bracteoles very small, subulate; pedicels ·05 in. long, thick, angular, glabrous or minutely pubescent, equal to or shorter than the bracteoles; buds globose. *Calyx-lobes* ovate, ciliate, minute, ·03 in. long, not gland-dotted. *Corolla-lobes* free, ovate, acute, ·075 in. long, nearly glabrous outside, papillose within. *Stamens* shorter than corolla-lobes, inserted one-third up, reniform, with inconspicuous black dots at the insertion of the short dorsifixed filaments. *Ovary* ovoid glabrous; style very short; stigma peltate. *Berry* red, ovoid, somewhat pyriform, ribbed and gland-dotted, glabrous, crowned with the remains of a cylindric style and capitate stigma. *E. coriacea*, Stapf in Trans. Linn. Soc. Ser. ii. IV. 200 (*not of A. DC.*)

PERAK: *Wray* 1524—on Ulu Batang Padang at nearly 5,000 ft.—DISTRIB. Borneo, *Haviland* No. 1152, on Mt. Kinabalu at 7,600 to 8,800 feet.

The description of the flowers is taken from Haviland's Borneo specimen, the rest from Wray's.

9. *EMBELIA LAMPANI*, Scheff. Myrs. 37 (1867). A slender climbing shrub, clinging to trees; branches reddish-brown, rough with strigose hairs, lenticellate; branchlets rusty-villous-hairy. *Leaves* chartaceous; oblong, obtuse or emarginate at apex, rounded or cordate at base; margins recurved, upper surface glabrous except on the midrib, lower surface rusty-villous, glandular dots many, scattered; 1·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves many (up to 24 pairs), irregular, at about two-thirds of a right angle with the midrib, straight at first then curving

upwards to meet in a nerve more or less parallel to the margin; secondary nerves similar, reticulations many; petiole  $\cdot 1$  to  $\cdot 2$  in long, rusty-villous. *Inflorescence* of terminal panicles of pedunculate racemes 6 to 12 in. long, the branches often leafy, rachis and peduncles all rusty-villous; peduncles  $\cdot 5$  to  $\cdot 7$  in. long, pedicels slender, about  $\cdot 05$  in. long; bracts few, leaf-like; bracteoles rather longer than the pedicels, lanceolate to spathulate; flowers small, buds globose, petals white, striate, tube red. *Calyx-lobes* 5–6, ovate, acute, ciliate on the edges, villous, dotted with few glands; tube as long as lobes, both together  $\cdot 05$  in. long, longer in fruit. *Corolla* gamopetalous from one-third to one-half of its length; lobes oblong, obtuse, recurved,  $\cdot 1$  in. long, sparsely gland-dotted. *Stamens* as long as or a little shorter than the corolla-lobes, inserted about half-way up, anthers oblong, dehiscent longitudinally, the back with black conspicuous glandular warts; filaments adnate to the corolla below point of insertion, slender, dorsifixed. *Ovary* rounded, glabrous, style cylindric, stigma peltate in ♀, slightly lobed in ♂. *Berry* globose,  $\cdot 1$  to  $\cdot 15$  in. in diam., black when dry, crowned with the persistent style, rugosely glandular. Clarke in Hook. f. Fl. Br. Ind. III. 514. *E. villosa*, Wall. Cat. 2313 (*in part*). *Grenacheria Wallichiana*, Mez Monog. Myrs. 293, fig. 49. *G. Lampani*, Mez l.c. 294.

PENANG: Curtis 305; *G. King*. PERAK: Wray 95, 2784; *Scortechini* 231; *King's Collector* 2483, 4210, 6849, 8134. SELANGOR: *Ridley* 10224. MALACCA: *Maingay* (K.D.) 1003. SINGAPORE: *Ridley* 10417.—DISTRIB. Sumatra, *Korthals*; Borneo, *Haviland & Hose*.

Haviland and Hose's Borneo specimens have rather larger flowers than, and pedicels about twice as long as, those from the Peninsula (No. 2280).

10. *EMBELIA AMENTACEA*, Clarke in Hook. f. Fl. Br. Ind. III. 514 (1882). A slender climbing shrub; branches pale brown, velvety; branchlets cinnamomeous or rusty-villous. *Leaves* chartaceous; oblong or obovate-oblong, obtuse and sometimes emarginate at apex, rounded at base; upper surface sparsely pilose, under surface pubescent, pale bluish-green, glandular dots many prominent; 2 to 3 in. long,  $\cdot 75$  to  $\cdot 1$  in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves few, 6 to 10 pairs, irregular, at about two-thirds of a right angle with the midrib, arching upwards, branching and joining in a nerve near the margin; secondary nerves similar but more slender, reticulations not prominent; petiole  $\cdot 15$  in. long, villous, winged by the decurrent base of the blade. *Inflorescence* of terminal panicles of pedunculate racemes, the branches leafy, the leaves passing gradually into oblong or spathulate conspicuous bracts; peduncles 1 to 1.5 in. long, enlarged at base; pedicels  $\cdot 1$  in. long, supported by linear subulate bracteoles twice their

length, so that when in bud the racemes have the appearance of catkins; flowers very small, buds globose. *Calyx-lobes* 5, acute, ciliate on the edges, gland-dotted, tube as long as lobes, both together .05 in. long. *Corolla* very shortly gamopetalous; lobes 5, ovate, obtuse, glabrous within, .05 in. long. *Stamens* very short, shorter than corolla-lobes, inserted about half-way up; anthers oblong, rounded, with black papillose warts on the back; filaments as long as anthers, dorsifixed. *Ovary* rounded, glabrous, conical above, style slender, stigma peltate. *Berry* globose, wrinkled when dry, .1 to .125 in. in diam., crowned with the persistent style and stigma, black when dry. *Grenacheria amentacea*, Mez Monog. Myrs. 294.

PERAK: *Scortechini* 802; *Ridley* 7172 (part); *King's Collector* 5055, 6280, 6817, 8692—in open ground and in bamboo forests. SELANGOR: *Ridley* 7561, *Native Collector* 2802A, *Goodenough* 10555. MALACCA: *Griffith* (K.D.) 3548.

Mez suggests that this may be a young state of *Grenacheria Wallichiana*. He apparently saw only Griffith's specimen. The abundant material now available clearly shows that Clarke correctly considered it as separate. The curious catkin-like young inflorescence and the more sparse leaf-venation distinguish it.

11. *EMBELIA RIDLEYI*, King & Gamble, n. sp. A climbing (?) shrub; branchlets light brown, wrinkled. *Leaves* chartaceous; oblong, acute at apex, rounded at base; glabrous, glandular dots scattered obscure, margin somewhat recurved; 4 to 7 in. long, 1.5 to 3 in. broad; midrib thick, prominent below; main-nerves prominent below, about 12 pairs, curving upwards and meeting in a looped intramarginal nerve; secondary nerves and reticulations faint; petiole .5 in. long, thick. *Inflorescence* an axillary panicle of racemes, the branches curved, distant; rachis .5 to 1 in. long, that of racemes shorter, bracteoles minute, triangular; racemes about .5 in. long. *Calyx-lobes* 4 or 5, ovate, gland-dotted, very small. *Corolla* and rest not seen.

SINGAPORE: *Ridley* 6324. It seems to come near to *E. floribunda*, Wall.

*E. Tsjeriam-Cottam*, A. DC. is quoted by Mez as extending from India southwards to Singapore, but we have seen no specimens from our region.

12. *EMBELIA MYRTILLUS*, Kurz in Journ. As. Soc. Beng. XL. ii. 67 (1871), and For. Fl. II. 104. A small climbing shrub (Wray); branches rough, somewhat corky, with large lenticels; ultimate branchlets densely rusty-villous. *Leaves* coriaceous; bifarious, broadly elliptic to almost orbicular, acute at apex with usually 3 terminal teeth, narrowed truncate or cordate at base; glabrous above, slightly villous on nerves beneath; glandular dots black, numerous, small, fewer large, scattered, especially

near the apex and along the margin, which is often recurved; .4 to .7 in. long, .3 to .6 in. broad; midrib prominent; main-nerves 6 pairs, arched upwards and joining in an intramarginal nerve; secondary nerves similar, reticulations prominent; petiole .1 in. long, villous. *Flowers* tetramerous, very small, in umbels or very short racemes on short axillary arrested branches, .1 to .15 in. long, shorter than the leaves; bracts minute, subulate. *Calyx-lobes* ovate, glandular ciliate, densely papillose within, .05 in. long, tube very short. *Corolla-lobes* free, oblong, rounded at apex, .1 in. long, glandular-ciliate on the edges, conspicuously marked with black, oblong or linear glands. *Stamens* longer than the corolla-lobes in ♂ flowers, shorter in ♀; anthers oblong, often cordate, with conspicuous warts at the insertion of the dorsifixed filaments which spring from the base of the petals. *Ovary* ovoid; style slender; stigma capitate, 4-cleft. *Berry* globose, red or black, .15 to .2 in. in diam., prominently gland-dotted, tipped with the persistent style and stigma. Clarke in Hook. f. Fl. Br. Ind. III. 516; Mez Monog. Myrs. 322. *Myrsine Myrtillus*, Hook. Ic. Pl. t. 825. *Samara Myrtillus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223.

PERAK: *Scortechini* 762; *Wray* 1565, 3818, on Gunong Bubu and Gunong Brumber, at 5,000 to 7,000 feet. MALACCA: summit of Mount Ophir, *Griffith* (K.D.) 3542; *Lobb*; *Ridley*.—DISTRIB. Burma, *Griffith*.

13. *EMBELIA PARVIFLORA*, Wall. Cat. 2307 (1829). A slender climbing shrub reaching 60 feet in length; branches and branchlets densely rusty-villous, slender. *Leaves* chartaceous; distichous, ovate, obtusely acute at the apex, truncate at base; glabrous except on the midrib beneath; margin slightly recurved; glandular dots many, prominent, scattered, more numerous towards the apex; .7 to 1.5 in. long, .5 to .75 in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 10 pairs, slender, curving upwards towards the margin; secondary nerves slender, many, reticulations prominent; petiole scarcely .05 in. long, rusty-villous, channelled above. *Inflorescence* of very short axillary few-flowered subumbellate racemes, ♂ 4–6-flowered with .15 in. long slender pedicels, ♀ 1–3-flowered with .05 in. slender pedicels; bracts in both minutesubulate; flowers pentamerous; buds globose. *Calyx-lobes* oblong, fimbriate-ciliate, .05 in. long, with few (about 6) large brown glands, glandular-villous without, tube very short, ciliæ moniliform. *Corolla-lobes* ovate, rounded, ciliate, .075 in. long, .05 in. broad, with few unequal-sized prominent brown glands. *Stamens* in ♂ flowers longer than corolla-lobes, in ♀ much shorter; anthers reniform, in ♂ apiculate and warted at back at the insertion of the dorsifixed, rather long filaments which spring from near the base of the corolla-lobes. *Ovary*

rounded, glabrous; style slender, curved, stigma peltate, at any rate in ♀. *Berry* globose, red, black when dry, smooth, .15 to .2 in. in diam., surmounted by the remains of the style and stigma. A. DC. in Trans. Linn. Soc. XVII. 130 (excl. var.  $\beta$ ), Prod. VIII. 86; Scheff. Myrs. 44; Kurz For. Fl. II. 104; Clarke in Hook. f. Fl. Br. Ind. III. 515; Mez Monog. Myrs. 324. *Samara parviflora*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223. *Celastrinea*, Griff. Itin. Notes 85, n. 1226.

PERAK: *Scortechini*; Wray 4194—at Maxwell's Hill, Larút, 3,500 feet; *Curtis* 2059—on Hijan Range; *King's Collector* 2342, 6992—from dense forests on high hills at 3,000 to 5,000 feet.—DISTRIB. Khasia and Naga Hills; Upper Burma, *Griffith* (K.D.) 3545, &c.; Sumatra.

#### IMPERFECTLY KNOWN SPECIES.

14. *EMBELIA LUCIDA*, Wall. Cat. 2315. *Leaves* 3 in. long, 1.25 in. broad, broadly oblong, suddenly narrowed at both ends, entire, glabrous, coriaceous. *Racemes* 1 in. long, axillary, simple, solitary or paired, rusty-villous. A. DC. Trans. Linn. Soc. XVII. 134, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 517; Mez Monog. Myrs. 396.

SINGAPORE: *Wallich* 2315.

15. *EMBELIA MACROCARPA*, King & Gamble, n. sp. A strong climber, branchlets thick, nearly black, rough. *Leaves* coriaceous; elliptic, obtuse or shortly acuminate at apex, almost rounded at base, glabrous, margin reflexed; 6 in. long, 3 to 4 in. broad; midrib rather slender; main-nerves irregular, distant, not prominent, about 8 pairs; secondary nerves slender, obscure as are the reticulations; petiole .7 to 1 in. long, thick, bordered above by the decurrent margins of the leaves. *Flowers* apparently on rather short, thick racemes from the branches. *Calyx-lobes* 4, triangular, acute, gland-dotted, under .1 in. long. *Berry* large, .5 to .7 in. in diam., smooth, wrinkled when dry, globose, crowned with the short remains of the persistent style. *Seed* with many conspicuous pits. Rest not seen.

PENANG: at Marriot's Road, 1,500 feet, *Curtis* 1229.

The following Burmese species is here inserted, as it is found in Tenasserim and may occur further south in the Malay Peninsula.

*EMBELIA GALLATLYI*, King & Gamble, n. sp. Apparently a shrub; branchlets rounded, dark brown, lenticellate. *Leaves* ovate, acuminate at apex, truncate at base; prominently crenate dentate with blunt teeth and glands in the crenatures; glabrous on both surfaces, glandular dots few, chiefly near the margin; 1 to 1.4 in. long, .5 to .7 in. broad; midrib slender, impressed above; main-nerves 10 to 12 pairs; arching upwards to the crenatures; secondary nerves many, slender, reticulations prominent; petiole .1 to .2 in. long, channelled above, crispately edged. *Inflorescence* of axillary corymbose racemes, 10-12-flowered, rachis about 2 in. long, bracts minute subulate,



the whole minutely rusty-pubescent, pedicels slender. *Calyx-lobes* triangular acute .03 to .05 in. long, ciliate; tube as long as lobes or somewhat shorter. *Corolla-lobes* oblong-spathulate, .1 in. long, ciliate, minutely pubescent, sparsely gland-dotted. *Stamens* longer than corolla-lobes, .15 in., anthers oblong, cells parallel, not warted behind at the insertion of the long exsert filaments which spring from close to the base of the corolla-lobes. *Ovary* ovoid-conical, style short curved, stigma minute. *Berry* unknown.

TENASSERIM: at Moolyet, 5,000 feet, *G. Gallatly* No. 407. *Gamble* No. 7906 from Mianimukh, Chittagong Hill Tracts, without flowers or fruit, is probably this species.

#### 4. LABISIA, Lindl.

Small shrubs, with a creeping rhizome and erect stem, resembling *Pothos* in appearance. *Leaves* few, coriaceous, entire or denticulate, sessile or petiolate, the petiole often dilated, main leaf-nerves very many, at right angles to the midrib. *Flowers* hermaphrodite, minute, pink, in axillary spike-like panicles, bracts very small. *Calyx* minute, 5-lobed. *Corolla* 5-lobed, lobes ovate, induplicato-valvate in bud; tube very short. *Stamens* 5, wrapped in the corolla-lobes; filaments very short; anthers ovoid, introrsely dehiscent, no staminodes. *Ovary* globose, attenuated into a short style; stigma small; ovules few, immersed in a globose central placenta. *Fruit* small, globose, red, 1-seeded. *Seed* globose, hollowed at the base; albumen smooth; embryo cylindric transverse. —DISTRIB. About 4 species, all of the Malay Peninsula and Archipelago.

Leaves petiolate without decurrent wings:—

- |                                                                    |                                               |
|--------------------------------------------------------------------|-----------------------------------------------|
| Leaf-blades elliptic-lanceolate, much longer than broad            | 1. <i>L. pumila</i> var. <i>lanceolata</i> .. |
| Leaf-blades ovate or ovate-orbicular, nearly as broad as long.. .. | 2. <i>L. paucifolia</i> .                     |

Leaves with winged petioles or sessile:—

- |                                                               |                       |
|---------------------------------------------------------------|-----------------------|
| Wings very narrow, blade of leaf acuminate at both ends .. .. | 1. <i>L. pumila</i> . |
|---------------------------------------------------------------|-----------------------|

Wings broad:—

- |                                                                      |                                           |
|----------------------------------------------------------------------|-------------------------------------------|
| Leaves crenate, thin, main-nerves rather distant ..                  | 1. <i>L. pumila</i> , var. <i>alata</i> . |
| Leaves entire, coriaceous, main-nerves very close and regular ... .. | 3 <i>L. longistyla</i> .                  |

1. LABISIA PUMILA, Benth. & Hook. f. Gen. Pl. II. 645 (1876). A semi-herbaceous undershrub, with rooting stems and leaves not jointed at their insertion but decurrent into them. *Leaves* bluish-green, elliptic-lanceolate, acuminate, narrowed at the base, and more or less decurrent on the petiole; crenately toothed, or sometimes nearly entire; blade 5 to 8 in. long by 1 to 2.5 in. broad; midrib thick, often rusty-pubescent; main-nerves extremely numerous, nearly at right angles to the midrib, parallel, slender, anastomosing towards the margin, and

then producing an elegant network; under-surface with brown glandular scales; petiole 1 to 3 in., enlarged at the base, often minutely rusty-pubescent. *Flowers* pink, in a spike-like, long-stalked, ferruginous-tomentose panicle of small corymbose bracteate clusters; peduncles of corymbs 1 in. long or shorter, sometimes none; bract linear-subulate, .05 to 1 in. long.; pedicels .05 to 1 in., slender, with minute bracteoles. *Calyx-lobes* triangular, acute, .025 in. long, densely glandular. *Corolla-lobes* ovate, with linear glands, glabrous. *Stamens* infolded in the corolla; filaments very short; anthers oblong-linear, apiculate, with several hard round or linear black warts on the back. *Ovary* rounded, pubescent, ending in a subulate angular style with minute notched stigma. *Fruit* a globose red berry, about .15 in. in diam., ribbed and with prominent elongate glands, surmounted by the persistent style. Mez Monog. Myrs. 171 (var. *genuina*). *L. pothoina*, Lindl. in Bot. Reg. 31. t. 48; Clarke in Hook. f. Fl. Br. Ind. III. 518; Stapf in Trans. Linn. Soc. Ser. 2, IV. 200; *Ardisia pumila*, Blume Bijdr. 688; A. DC. Prod. VIII. 137; Miq. Pl. Jungh. 199 and Fl. Ind. Bat. II. 1028; Scheff. Myrs. 92. *A. ? spicata*, Wall. Cat. 2273; A. DC. in Trans. Linn. Soc. XVII. 135.

SINGAPORE or PENANG: *Walker*, 165. PENANG: *Curtis* 1192; *Kunstler* 1159. PERAK: *Scortechini*; *Wray* 753A. MALACCA: *Maingay* 1013 (K.D.); *Stoliczka*. SINGAPORE: *Ridley* 1804.—DISTRIB. JAVA: *Forbes* 238, 474. In dense moist forests on the lower slopes of hills.

VAR. *lanceolata*, Scheff. l.c. 93. *Leaves* elliptic-lanceolate, acuminate, somewhat rounded at base; not, or very slightly, decurrent; blade 5 to 8 in. long, by 1.5 to 3.5 in. broad; petiole 2 to 5 in. long not winged. *Inflorescence* more slender, bracts often longer than the peduncle of the corymb. Clarke in Hook. f. Fl. Br. Ind. III. 518; Mez Monog. Myrs. 172. *L. pothoina*, N. E. Brown (*non* Lindl.) in Ill. Hort. XXXII. 95 tab. 561.

PENANG: *Hullett* 201. PAHANG: *Goodenough* 2799. SINGAPORE: *Lobb* 61; *Kurz*; *T. Anderson* 196.—DISTRIB. Sumatra, *Korthals*; Borneo, *Motley* 1250, *Haviland*.

VAR. *alata*, Scheff. l.c. 93. *Leaves* thin ashy-green above, dark green below, elliptic oblong, rounded at top or obtusely acuminate; gradually or suddenly narrowed into a broad wing decurrent on the petiole; crenate glands and scales few or none; 6 to 16 in. long, 2 to 4 in. broad. *Inflorescence* with the corymbs usually more closely congested and on a shorter peduncle; flowers somewhat smaller, bracts usually longer than the corymb peduncle, flowers white or pink. Mez Monog. Myrs. 172. *L. alata*, N. E. Brown in Ill. Hort. XXXIII. 123, t. 605.

PERAK: *Wray* 753B, 824, 2482, 2737; *Scortechini*; *King's Collector*

980, 2815, 2882, 2891, 2942, 2974, 2999, 3376, 8325, 10949. SINGAPORE : *Lobb* 313.—DISTRIB. Sumatra, *Korthals* ; Borneo.

2. *LABISIA PAUCIFOLIA*, King & Gamble, n. sp. A small semi-herbaceous undershrub, 10 to 15 in. high; the stems striate, round, minutely purplish-brown-pubescent, bearing rarely more than 3 to 4 leaves. *Leaves* long-petioled, the blade ovate or orbicular-ovate, rounded at top into a bluntly acute point, rounded at base and then very shortly decurrent; entire or very minutely crenate; 2·5 to 4 in. long, 1·5 to 3 in. broad; main-nerves slender, numerous, more or less parallel, joining near the edge; petiole 1 to 2 in. long, thickened at the base and decurrent into the stem. *Inflorescence* 1·5 to 2·5 in. long, consisting of axillary, short-peduncled, rusty-pubescent racemes, the flowers reflexed, single or in few-flowered sessile clusters; pedicels ·05 to ·1 in. long, with short subulate bracts of equal length. *Calyx-lobes* ovate-acuminate, covered without with numerous glands, ·075 in. long; tube short, about half the length of lobes. *Corolla-lobes* oblong-acuminate, ·125 in. long, glabrous. *Stamens* closely enfolded; filaments very short; anthers hastate, long apiculate, glandular warted behind, ·1 in. long. *Ovary* rounded, pubescent; style about ·04 in. long, angular, oblique; stigma minute, notched. *Fruit* a dark red berry, ·1 in. in diam., striate and with oblong glands.

PERAK : *Scortechini*; *Wray* 4102; *King's Collector* 8078. In open forest at 3,000 to 5,000 feet.

Besides the characteristic leaves, the acuminate petals and hastate long apiculate anthers make this species recognisable, though the leaf-venation resembles that of *L. pumila*.

3. *LABISIA LONGISTYLA*, King & Gamble, n. sp. An undershrub about 2 feet high; stem thick, rusty-brown, minutely pubescent. *Leaves* sessile, oblong, entire, rounded at apex and very slightly emarginate, decurrent below in a broad wing for about  $\frac{1}{6}$  of their length; prominently glandular-pitted above and with rusty glandular scales below; 7 to 12 in. long, 3 to 4 in. broad; midrib very thick, prominent, glandular scaly; main-nerves at right angles to midrib, extremely numerous, straight, parallel, anastomosing towards the edge which is slightly recurved. *Inflorescence* a raceme-like rusty-pubescent panicle of single flowers or shortly peduncled few-flowered secund corymbs, 8 to 9 in. long, the main peduncle about 4 in.; corymb-peduncles curved, angled, ·3 to ·4 in. long; bracts very short, subulate; pedicels striate, about ·15 in. long; bracteoles minute. *Calyx-lobes* ovate, acute, glandular without, tube rather shorter than lobes, together ·06 in. long. *Corolla* and *stamens* unknown. *Ovary* rounded, pubescent, crowned by a

filiform .2 in. long style. *Fruit* a globose berry, with a conical top and the remains of the style, glabrous, striate with linear-oblong prominent glands.

PERAK: *Wray* 1590. SELANGOR: *Curtis* 3750, at 3,000 to 4,000 feet.

### 5. ARDISIA, Swartz.

Small trees, shrubs or semi-herbaceous undershrubs, evergreen, generally all parts with pellucid glands which often dry black. *Leaves* sessile or petiolate, membranous to coriaceous, entire crenate or serrate. *Flowers* regular, pedicellate, hermaphrodite; inflorescence various. *Calyx* inferior, 4-6-lobed, the lobes free or overlapping to the right; tube very open, as long as or shorter than the lobes. *Corolla* red white or spotted, often waxy in appearance, 4-6-lobed, the tube often very short; the lobes overlapping to the right, often twisted. *Stamens* equal in number to, and opposite to, the corolla-lobes, sometimes long and narrow, usually sagittate-lanceolate and apiculate, sometimes very small, fixed to the corolla-tube by filaments usually short and broad; generally opening by slits, occasionally by terminal pores, in *A. littoralis* septate; dehiscence always introrse. *Ovary* globose, sometimes narrowed into the style, more often almost depressed; style usually filiform, rather long; stigma punctiform; ovules few or many, immersed in a globose placenta. *Fruit* a globose, rarely obovoid, berry, usually surmounted by the remains of the style, fleshy, red or purple or black, often spotted; endocarp crustaceous; 1-seeded. *Seed* solitary, large, globose, hollowed at the base; albumen pitted or ruminant; embryo cylindric horizontal.—DISTRIB. 200 to 250 species, all of tropical or sub-tropical regions in both worlds, scarce in Africa.

Leaves entire or crenate, never serrate:—

Leaves entire, or if crenate without glands in the crenatures:—

Calyx-lobes not, or only slightly, overlapping to the right, usually small:—

Inflorescence lateral:—

Inflorescence short-peduncled, shorter than the leaves (I. PIMELANDRA):—

Leaves entire; inflorescence on wood of current and past years:—

Leaves over 6 in. long; nerves conspicuous:—

Leaves nearly glabrous beneath;  
main-nerves less than 20 ..

1. *A. pachysandra*.

Leaves densely tomentose beneath;  
main-nerves more than 20 ..

2. *A. Teysmanniana*.

- Leaves under 6 in. long :—  
 Leaves shining, nerves obscure ;  
 flower-buds very short, rounded .. 3. *A. chrysophyllifolia*.  
 Leaves not shining, nerves conspicuous ; flower-buds long, acuminate 4. *A. solanoides*.  
 Leaves crenate ; inflorescence on wood of current year .. 5. *A. fulva*.  
 Inflorescence long-peduncled (II. AKOSMOS) :—  
 Peduncles slender, under 1 in. long, pubescent ; leaves membranous .. 6. *A. ferruginea*.  
 Peduncles thick, 3 to 3·5 in. long, glabrous ; leaves coriaceous .. 7. *A. lankawiensis*.  
 Inflorescence terminal :—  
 Style exsert in the bud (III. STYLARDISIA) :—  
 Leaves membranous ; inflorescence short, few-flowered .. 8. *A. andamanica*.  
 Leaves chartaceous or coriaceous, inflorescence elongate, many-flowered :—  
 Leaves without a conspicuous intramarginal nerve :—  
 Calyx-lobes ·05 in. long or under, usually glabrous :—  
 Leaves coriaceous :—  
 Leaves not thickly scaly beneath :—  
 Nerves of leaves obscure, leaves dark when dry .. 9. *A. tuberculata*.  
 Nerves of leaves prominent, leaves pale when dry .. 10. *A. ophirensis*.  
 Leaves thickly scaly beneath :—  
 Leaves broad ; main-nerves very many, prominent, over 24 pairs 11. *A. labisiaefolia*.  
 Leaves narrow ; main-nerves fewer, obscure, 20 pairs .. 12. *A. montana*.  
 Leaves chartaceous :—  
 Panicles slender, elongate ; leaves usually small, main-nerves at about 60° to midrib .. 13. *A. sinuata*.  
 Panicles rather thick, compact ; leaves generally large, main-nerves at about 75° to midrib .. 14. *A. colorata*.  
 Calyx-lobes ·2 in. long, ferruginous pubescent .. 15. *A. crassa*.  
 Leaves with a conspicuous intramarginal nerve .. 16. *A. platyclada*.  
 Style not exsert in the bud (IV. ACRARDISIA) :—  
 Branches of the inflorescence racemose ; buds long, slender .. 17. *A. porosa*.  
 Branches of the inflorescence umbellate ; buds short, conical .. 18. *A. divergens*.  
 Calyx-lobes clearly overlapping to the right, usually large and broad :—  
 Inflorescence terminal (V. TINOPSIS) :—

- Leaves under 6 in. long; panicle compact, pedicels slender, flowers rather small; berry globose, .2 in. in diam. .. 19. *A. sumatrana*.
- Leaves usually over 6 in. long; panicle spreading, pedicels stout, flowers large; berry depressed, over .25 in. in diam. .. 20. *A. lanceolata*.
- Inflorescence lateral (VI. TRINUS):—
- Anthers septate; leaves coriaceous, obovate, inflorescence short .. 21. *A. littoralis*.
- Anthers not septate:—
- Leaves usually over 6 in. long:—
- Leaves 8 to 15 in. long, elliptic, buds .25 in. long .. 22. *A. Kunstleri*.
- Leaves 5 to 10 in. long:—
- Main-nerves at about an angle of 60° with midrib:—
- Buds .4 in. long or more; leaves coriaceous:—
- Buds conical; calyx-lobes rounded; raceme glabrous .. 23. *A. solanacea*.
- Buds rounded; calyx-lobes emarginate, raceme rusty-pubescent .. 24. *A. lurida*.
- Buds .3 in. long only, rounded; leaves chartaceous .. 25. *A. oxyphylla*.
- Main-nerves at only about 30° with the midrib; calyx-lobes emarginate .. 26. *A. Scortechinii*.
- Leaves usually under 6 or even 5 in. long:—
- Leaves few-nerved; inflorescence long, racemose .. 27. *A. pendula*.
- Leaves many-nerved; inflorescence short, 1-5-flowered .. 28. *A. Hullettii*.
- Anthers not known; leaves 7 to 10 in. long, under .25 in. broad; main-nerves at an angle of 80° with midrib in an elegant network with secondary nerves and reticulations .. 29. *A. oblongifolia*.
- Anthers not known; leaves elliptic or elliptic-ovate, acuminate, 4.5 to 6.5 in. long; calyx-lobes 4; inflorescence apparently terminal .. 30. *A. tetrasepala*.
- Anthers not known; leaves 3 to 5 in. long, under 1.5 in. broad, acuminate, flowers 2 .. 31. *A. biflora*.
- Anthers not known; leaves 4 to 6 in. long, .7 to .9 in. broad, linear-lanceolate; flowers in peduncled axillary umbellate racemes, about 5 to 8 .. 32. *A. tukanica*.
- Leaves crenate, with glands in the crenatures (VII. CRISPARDISIA):—
- Calyx-lobes more or less gland-dotted:—
- Calyx-lobes oblong, obtuse or obtusely acute:—
- Calyx-lobes lingulate, over .25 in. long, sparsely dotted; inflorescence short; leaves lanceolate, more or less villous .. 33. *A. villosa*.
- Calyx-lobes under .1 in. long, prominently

dotted; inflorescence long; leaves oblong,  
glabrous, pale .. .. 34. *A. virens*.

Calyx-lobes ovate, more or less acute:—

Inflorescence axillary, racemose or umbel-  
late:—

Racemes or umbels in the axils of upper  
leaves only:—

Leaves over 5 in. long, crenatures broad,  
very shallow, rounded:—

Leaves membranous, pedicels slender 35. *A. Wrayi*.

Leaves coriaceous, pedicels thick .. 36. *A. minor*.

Leaves under 4 in. long, crenatures  
narrow, almost dentate .. .. 37. *A. perakensis*.

Racemes in the axils of all or nearly all  
the leaves, crenatures narrow .. 38. *A. Meziana*.

Inflorescence terminal or pseudo-terminal:—

Inflorescence of a single sessile, umbellate  
raceme; leaves 4 to 8 in. long .. 39. *A. Ridleyi*.

Inflorescence usually of paniced racemes;  
leaves 2 to 4 in. long .. 40. *A. crenata*.

Calyx-lobes not gland-dotted; inflorescence ter-  
minal or pseudo-terminal:—

Branches of inflorescence short, not more than  
1 in. long; leaves 2 to 4 in. long .. 41. *A. rosea*.

Branches of inflorescence 2 to 3 in. long;  
leaves 4 to 6 in. long .. 42. *A. longepedunculata*.

Leaves acutely and prominently serrate occasionally  
abortive (VIII. BLADHIA):—

Inflorescence long, reaching 6 to 8 in.; leaves  
large, nearly or quite sessile .. 43. *A. Maingayi*.

Inflorescence short, under 2·5 in.; leaves  
petioled:—

Inflorescence 1·5 to 2·5 in. long; anthers  
mucronate; leaves under 3 in. long .. 44. *A. theaefolia*.

Inflorescence under 1·5 in. long; anthers  
emarginate; leaves over 4 in. long:—

Leaves and branchlets fulvous-villous;  
flowers pink; ovary and base of style  
pubescent .. .. 45. *A. odontophylla* var. *Lobbii*.

Leaves and branchlets glabrous; flowers  
white; ovary and base of style glabrous .. 46. *A. bambusetorum*.

1. *ARDISIA PACHYSANDRA*, Mez Monog. Myrs. 97 fig. 14 A–E (1901).

A large shrub or small tree reaching to 40 to 50 feet high, and 6 to 10 in. diam.; branches with pale brown bark, marked with decurrent lines below the leaves or leaf-scars; branchlets thickly rusty-villous at the ends. *Leaves* membranous; oblong or slightly obovate, acute at apex, cuneate at base; glabrous above, except on the midrib which is sometimes minutely pubescent, glabrous or slightly pubescent beneath; entire, glands numerous near the margins; 6 to 10 in. long, 1·5 to 3 in. broad; midrib thick, slightly impressed above; main-nerves

14 to 20 pairs, irregular, .4 to .5 in. apart, starting at an angle of about 60°, then slightly arching to and along the margin; petiole .4 to .6 in. long, pubescent, wrinkled, slightly channelled above. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels or corymbs; peduncles .1 in. long, flowers 6 to 8; pedicels slender, pubescent, striate, .4 in. long; bracts minute, subulate, densely pubescent, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .2 in. long, slightly overlapping to the right, ciliate, gland-dotted especially near the tip. *Corolla-lobes* boat-shaped, broadly ovate, shortly acuminate, .3 in. long, glabrous, white, faintly nerved, dots very few, revolute in flower; tube short. *Stamens* a little shorter than corolla-lobes; anthers ovate, cuspidate-acuminate, much gland-dotted and warted at the back on the connective; filaments thick. *Ovary* rounded, glabrous, style subulate, as long as the anthers. *Berry* .2 to .4 in. in diam., globose, glabrous, pale. *Myrsine pachysandra*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 297; Wall. Cat. 2284; A. DC. in Trans. Linn. Soc. XVII. 111. *Pimelandra Wallichii*, A. DC. in Ann. Sc. Nat. 2. XVI. 88; Prod. VIII. 106; Deless. Ic. Sel. V. 14. t. 31; Scheff. Myrs. 94; Miq. Fl. Ind. Bat. II. 1029; Clarke in Hook. f. Fl. Br. Ind. III. 531.

PENANG: *Wallich* 2284; *Porter*; *Curtis* 1156, 3164, 3181, 3737. MALACCA: *Griffith* (K.D.) 3597; *Maingay* (K.D.) 1006. PERAK: *Wray* 1358; *King's Collector* 5995, 7194.—DISTRIB. Borneo (?).

2. *ARDISIA TEYSMANNIANA*, Scheff. in Tijdschr. Ned. Ind. XXXI. 368 and in Flora 253 (1870). A large shrub or small tree; branchlets brown, with wavy longitudinal lines passing downwards from the sides of the bases of the petioles, lenticels numerous, innovations densely ferruginous-pubescent. *Leaves* entire, chartaceous; oblong or slightly obovate-oblong or oblong-lanceolate, acuminate at the apex, alternate and sometimes abruptly rounded at base; glabrous above, densely ferruginous-tomentose beneath; glands very numerous, small, evenly distributed over the whole under surface; 6 to 11 in. long, 1.5 to 3 in. broad; midrib thick, prominent beneath; main-nerves 25 to 30 pairs, .3 to .4 in. apart, starting at an angle of 60°, at first straight, then curving to meet in the margin in a looped nerve, raised beneath as are the few secondary nerves and the many oblique reticulations; petiole very thick, .5 to .6 in. long, usually bordered by the decurrent margins of the blade which are again revolute. *Inflorescence* of axillary pedunculate umbels or corymbs; peduncles in flower .1 to .2 in. long, in fruit sometimes up to .5 in., 4-5-flowered; pedicels slender, .4 in. long, densely rusty-pubescent, striate; bracteoles linear-subulate, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .1 in. long, ciliate. *Corolla-lobes* ovate-acuminate, .2 in. long, softly



pubescent, glands inconspicuous, tube very short. *Stamens* nearly as long as corolla-lobes; anthers ovate, cuspidate-acuminate, concave and warted on the connective at the back, .175 in. long; filaments slender, .05 in. long, glabrous. *Ovary* rounded, glabrous; style slender, subulate, as long as stamens. *Berry* globose, slightly depressed, .3 in. in diam., black-gland-dotted, faintly ribbed. Mez in Monog. Myrs. 97. *Pimelandra Teysmanniana*, Hook. f. in Benth. & Hook. f. Gen. Pl. II. 64. *Pimelandra Wallichii* var. *Teysmanniana*, Clarke in Hook. f. Fl. Br. Ind. III. 531.

MALACCA: *Maingay* (K.D.) 1007. SINGAPORE: *Cantley*; *Ridley* 2800, 5573, 6788.—DISTRIB. Bangka.

This species is easily distinguished from the former by having many more and much closer nerves to the leaves, and by the dense rusty tomentum.

3. *ARDISIA CHRYSOPHYLLIFOLIA*, King & Gamble, n. sp. A tree, branchlets reddish-brown, innovations densely ferruginous-pubescent. *Leaves* entire, coriaceous; oblong-lanceolate, obtusely acute at apex, narrowed at base; glabrous on both surfaces; glands scattered, visible on the under surface; 4 to 6 in. long, .75 to 1.25 in. broad; midrib thick, prominent; main-nerves many, more or less parallel, inconspicuous, meeting, with the secondary nerves, in a wavy intramarginal nerve, reticulations fine; petiole .4 to .5 in. long, glabrous, channelled above and edged by the decurrent margin of the blade. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels of up to about 12 flowers; pedicels slender, .2 in. long, ferruginous-pubescent; bracts minute, triangular; buds very short, rounded. *Calyx-lobes* 5, ovate, minutely ciliate, pubescent and scaly outside, dotted with many conspicuous golden glands, .05 in. long, tube a little shorter. *Corolla-lobes* ovate, concave, sparsely glandular, glabrous, .08 in. long; tube none or very short. *Stamens* a little shorter than the corolla-lobes; anthers ovate acuminate, black-gland-dotted behind; filaments short. *Ovary* rounded, glabrous; style subulate, .05 in. long. *Berry* globose, somewhat depressed, covered with round and elongate glands, .15 in. in diam.

PERAK: at Lower Camp, Gunong Pateh, 3,400 feet, *Wray* 483, 1118, 1182.

4. *ARDISIA SOLANOIDES*, King & Gamble, n. sp. A small shrub, 3 to 4 feet high; branches slender, smooth, dark brown; branchlets glandular-hirsute, marked by obscure raised lines from the sides of the bases of the petioles. *Leaves* entire, membranous; elliptic, bluntly long caudate-acuminate at apex, attenuate at base; glabrous above, more or less glandular-hirsute beneath; glandular dots many, scattered, prominent; 2.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib slender,

raised beneath ; main-nerves 8 to 9 pairs, raised, at an angle of  $60^{\circ}$  with the midrib, the lowest pair more oblique, nearly straight, meeting at about two-thirds of the way to the margin in a looped intramarginal raised nerve, reticulations obscure ; petiole .15 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of sessile, axillary, umbellate, nearly glabrous racemes of about 4 to 6 flowers, racemes hardly .1 in. long ; bracteoles oblong-lanceolate, gland-dotted, .1 in. long ; pedicels slender, .3 to .4 in. long, slightly clavate ; buds conical, acuminate, .3 in. long ; flowers white with a blueish tinge. *Calyx-lobes* 4 to 5, very short, rounded, scarious and ciliate on the margins, gland-dotted. *Corolla-lobes* ovate below, caudate-acuminate above, twisted and reflexed in flower, .3 in. long, sparsely pale-glandular-punctate. *Stamens* nearly as long as corolla-lobes, lanceolate, membranous at tip, with two lines of glandular dots on the back of the connective. *Ovary* rounded ; style very slender, as long as stamens. *Berry* bright red, glossy, .25 in. in diam. when dry.

PERAK : in dense jungle on rich soil, at 500 to 800 feet, *King's Collector* 4254.

This species very closely resembles *Antistrophe caudata*, but is at once distinguished by the fact of the corolla-lobes overlapping to the right instead of to the left. The flowers somewhat resemble those of *Ardisia porosa*.

5. *ARDISIA FULVA*, King & Gamble, n. sp. Apparently a shrub ; branchlets rather thick, usually marked by raised lines descending from the bases of the leaves ; innovations densely tawny-villous ; leaf-buds lanceolate, densely pubescent. *Leaves* coriaceous ; elliptic-oblong or elliptic-lanceolate, shortly acuminate at apex, somewhat rounded at base ; glabrous or slightly scaly above, thickly tawny-villous beneath ; glandular dots few, scattered, obscure, in the areoles of the minor nerves ; crenate, especially in the upper two-thirds ; 4 to 7 in. long, 1 to 2 in. broad ; midrib slender ; main-nerves 20 to 24 pairs, irregular, arching upwards and joining in an intramarginal nerve ; secondary nerves slender, faint, reticulations curved ; petiole .4 to .6 in. long, winged by the decurrent edges of the blade. *Inflorescence* of short 1 to 1.5 in. long, densely tawny-pubescent, drooping, corymbs in the axils of tawny, leaf-like, often nearly 1 in. long, bracts from the young branches below the end leaves ; peduncles about .7 in. long, slender, pedicels slender, up to .5 in. long ; bracteoles subulate, short, tawny ; buds ovate, .2 to .25 in. long. *Calyx-lobes* ovate, thin, villous without, ciliate, .1 to .15 in. long, marked with prominent black dots, recurved in flower ; tube short. *Corolla-lobes* obovate, obtuse, .2 to .25 in. long, oblique, unequal, marked by prominent round or oblong black dots, tube short. *Stamens*

a little shorter than the corolla-lobes, acuminate, with 2 rows of prominent black dots behind the anthers; filaments short. *Ovary* ovoid, surmounted by a short, .1 in. long, subulate style, glabrous. *Berry* .2 in. in diam., black when dry, ribbed.

KEDAH: on Langkawi Island, *Curtis* 2133. PENANG: *Ridley* 10216. PERAK: *Ridley* 8269.

6. *ARDISIA FERRUGINEA*, Mez Monog. Myrs. 108 (1901). A shrub (?); branchlets slender, densely ferruginous-tomentose. *Leaves* membranous; linear- or oblong-lanceolate, bluntly acute at apex, rounded at base; glabrous or slightly rusty-scaly above, rusty-pubescent beneath; entire; glands not apparent; 3 to 4.5 in. long, .75 to 1 in. broad; midrib slender, nerves very faint; petiole .1 to .2 in. long, rusty-pubescent. *Stipules* small, linear-falcate. *Flowers* in densely ferruginous-pubescent, bipinnate panicles in the axils of upper leaves; peduncles .5 to .75 in. long; bracts linear subulate about .15 in.; pedicels slender, .1 to .2 in. long; bracteoles minute; buds conical. *Calyx-lobes* ovate, obtuse, ciliate, connate to rather over one-third, with wavy glandular dots. *Corolla-lobes* shortly connate at the base, broadly and obliquely ovate, short acuminate, gland-dotted. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate, gradually acute, scarcely punctate; filaments very short. *Ovary* ovoid, glabrous, style slender.

JOHORE: at Kampong Sunpai, *Lake & Kelsall* (*Ridley* 4032).

This species does not seem to differ very much from *A. Miqueliana*, Scheff. in *Tijdsch. Ned. Ind.* XXXI. 367, in respect to leaves, but that species has terminal and not axillary flowers.

7. *ARDISIA LANKAWIENSIS*, King & Gamble, n. sp. A tree; branchlets smooth, glabrous, obscurely striate, with raised lines from the edges of the bases of the leaf-petioles. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, acute at base, glabrous; entire; glandular dots frequent near the margins; 3.5 to 5 in. long, 1.25 to 1.5 in. broad; midrib slender; main-nerves obscure, about 12 to 14 pairs, anastomosing near the margin, secondary nerves and reticulations similar; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade. *Flowers* pink, in long-peduncled, closely congested racemes in the axils of the uppermost leaves; peduncles 3 to 3.5 in. long, flattened, glabrous; pedicels .5 to .7 in. long, striate, slender; bracteoles minute, caducous. *Calyx-lobes* ovate, acute, ciliate, with many glands on the back, .075 in. long. *Corolla-lobes* ovate, acuminate, much gland-dotted, .25 to .3 in. long. *Stamens* a little shorter than the corolla-lobes, ovate-lanceolate, mucronate, dehiscing on the margins but more widely near the top. *Ovary* rounded, obscurely 5-lobed; style .2 in. long, twisted and

wrinkled. *Fruit* a depressed, obscurely 5-angled berry, .2 in. in diam., pericarp very smooth inside.

KEDAH: on Lankawi Island, *Ridley* 8313.

8. *ARDISIA ANDAMANICA*, Kurz For. Fl. II. 108 (1877) and in Journ. As. Soc. Beng. XLVI. ii. 225. A small or medium-sized evergreen shrub reaching 15 feet high and 2 in. in diam.; branches slender with reddish-brown bark, striate when dry, branchlets glabrous. *Leaves* entire, membranous; oblong lanceolate, narrowly long acuminate at apex, cuneate at base; glabrous on both surfaces but with many scattered glandular dots and occasional peltate scales; 3 to 6 in. long, .75 to 1 .75 in. broad; midrib slender; main-nerves about 20 pairs, very thin and inconspicuous, at about 60° with the midrib, at first straight then arching upwards to and along the margin; petiole .3 to .5 in. long, channelled above. *Inflorescence* a loose terminal panicle 2 to 3 in. long, with few slender umbel-like racemes on .3 to .5 in. long, squarrose peduncles; pedicels slender, .3 in.; bracteoles small, ovate, deciduous. *Calyx-lobes* acute, triangular, .05 in. long, minutely ciliate at the edges, dotted with black glands; tube rather shorter than lobes. *Corolla-lobes* ovate, acute, .15 in. long, glabrous, with inconspicuous nerves and few scattered round or oblong glands. *Stamens* a little shorter than corolla-lobes; anthers ovate, apiculate, .1 in. long, glabrous on the back or with few black glands; filaments .05 in. *Ovary* rounded, glabrous; style filiform, long exsert, .15 in. long. *Berry* round or slightly pyriform, smooth, .3 in. in diam. Clarke in Hook. f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 110. *Ardisia neriifolia*, A. DC. Prod. VIII. 127 in part (not of Wall.), Trans. Linn. Soc. XVII. t. 8 (fig. only).

MALACCA: *Griffith* (K.D.) 3570; *Hullett* 830; *Stoliczka*. PERAK: *Ridley* 9718; *Wray* 867, 943, 971, 1033; *King's Collector* 5692, 8064. JOHORE: *Ridley* 3717.—DISTRIB. Andamans, Mergui.

9. *ARDISIA TUBERCULATA*, Wall. Cat. 2274 (1829). A shrub, reaching 10 feet in height; branchlets smooth, stout, reddish, uppermost flattened, glabrous. *Leaves* entire, coriaceous; elliptic, bluntly acuminate at apex, attenuate or rounded at the base; glabrous and shining above, covered beneath with rather deciduous peltate scales, dark when dry; 3 to 6 in. long, 1 to 2 in. broad; midrib prominent; main-nerves obscure, about 15 pairs, starting at an angle of about 75° from the midrib, then arched upwards to and along the margin; secondary nerves more slender, reticulations obscure; petiole .3 to .5 in. long, thick, rough, winged by the decurrent margins of the blade. *Inflorescence* a lax, leafy, terminal, tripinnate, 3 to 6 in. long, panicle; rachis flexuous, flattened, often scaly; primary peduncles squarrose, .6 to 1 in. long, supported by ovate acuminate leafy bracts; secondary peduncles also squarrose,

·3 to ·5 in. long with subulate bracts; ultimate racemes umbellate, 6–8-flowered; pedicels slender, short, ·1 to ·15 in. long; bracteoles subulate; buds ovoid, obtuse, glabrous. *Calyx-lobes* ovate, acute or rounded, ·05 in. long; margin ciliate, dotted with black glands. *Corolla-lobes* broadly ovate, blunt, glabrous, ·1 in. long, with very few dots; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers acute, but gland-dotted behind; filaments minute, broad. *Ovary* globose; style subulate, longer than the petals. *Berry* obovoid, smooth, ·15 to ·2 in. in diam. A. DC. in Trans. Linn. Soc. XVII. 119, Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1026; Clarke in Hook. f. Fl. Br. Ind. III. 521, *except* var.; Mez Monog. Myrs. 112, fig. 16. *A. chrysophylloides*, Miq. Fl. Ind. Bat. Suppl. 574.

PENANG: Wallich 2274. MALACCA: Derry 394. PAHANG: Ridley 1071. JOHORE: Ridley 6438. SINGAPORE: Griffith (K.D.) 3564; Maingay (K.D.) 1014; Ridley 2817, 8916, 1916(A).—DISTRIB. Bangka Teysmann.

10. *ARDISIA OPHIRENSIS*, Mez Monog. Myrs. 113 (1901). A shrub(?); branchlets pale brown, flattened, smooth; innovations minutely ferruginous-scaly. *Leaves* coriaceous; elliptic, shortly acuminate at apex, rounded or somewhat acute at base; pale and somewhat shining on both surfaces, the under covered with minute brown peltate scales; glands scattered, numerous; 3 to 6 in. long, 1·75 to 2·25 in. broad; midrib thick, prominent; main-nerves prominent, raised on both surfaces, 10 to 12 pairs, starting at an angle of about 75° with the midrib, at first straight then curving upwards to meet some way from the margin in a prominent network; secondary nerves prominent, reticulations transverse; petiole ·4 to ·5 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a terminal, leafy, angular, tripinnate panicle, about 3 to 4 in. long; rachis flexuous, flattened, scaly; peduncles squarrose, about 1 in. long, supported by ovate-oblong, reflexed, leafy bracts; pedicels ·3 in. long, slender, in fruit very spreading. *Calyx-lobes* ovate, acute, ·05 in. long, back dotted with prominent large glands. *Corolla-lobes* elliptic-ovate, rather oblique, shortly connate, nervose; glands few, near the apex, black. *Stamens* rather shorter than the corolla-lobes; anthers ovate, large, not glandular, apiculate; filaments short, slender. *Ovary* ovoid, glabrous; style long, subulate, exsert. *Berry* black when dry, ·15 in. in diam., with prominent glands. *A. tuberculata* var. *ophirensis*, Clarke in Hook. f. Fl. Br. Ind. III. 522.

MALACCA: Hullett 754; Ridley 621; Miller 9. On the top of Mount Ophir.

11. *ARDISIA LABISLÆFOLIA*, King & Gamble, n. sp. A small tree; branchlets thick, slightly flattened, smooth, glabrous below, lepidote-

scaly above. *Leaves* coriaceous; elliptic or elliptic-oblong, shortly and rather abruptly acuminate at apex, rounded at base; glabrous above when old, when young densely covered, as is the under-surface always, with rather large reddish-brown peltate scales, margins recurved; 6 to 8 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 30 pairs, irregularly spaced, at first parallel, leaving the midrib nearly at right angles, then near the margin curving upwards to and along the margin and anastomosing with the prominent secondary nerves which resemble the main ones; reticulations prominent in an elegant network, all more or less raised above when dry; petiole .5 to .8 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a pyramidal, rusty-scaly, bracteate, tripinnate panicle, up to 6 in. long, the branches bearing sub-umbellate, pedunculate clusters of small flowers; rachis somewhat flattened, rusty-scaly; bracts leafy spatulate; bracteoles minute, ovate; pedicels .1 to .2 in. long, reflexed. *Calyx-lobes* ovate, .06 in. long, ciliate, scaly and glandular-dotted; tube one-third of lobes. *Corolla-lobes* deep pink, ovate-acute, .14 in. long, with a very few black glands. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, .1 in. long, apiculate; filaments rather thick, .3 to .4 in. long, minutely pubescent. *Ovary* rounded, glabrous; style slender, exsert. *Berry* globose, often depressed at top, .15 to .2 in. in diam., black when dry.

PERAK: Wray 320, 1566; *Scortechini*. Hilltops at 6,500 to 7,000 feet.

12. *ARDISIA MONTANA*, King & Gamble, n. sp. A shrub reaching 4 to 6 feet in height; branchlets brown, somewhat angular, uppermost covered with a nearly furfuraceous glandular tomentum. *Leaves* coriaceous; elliptic-oblong or oblong-lanceolate, obtusely acuminate at apex, rounded or attenuate at base; scaly above, densely ferruginous-hairy and scaly beneath, scales stellate; glandular dots scattered, obscure; margins slightly recurved; 4 to 6 in. long, 1 to 2 in. broad; midrib prominent, impressed above; main-nerves 20 pairs, obscure, irregular, starting nearly at right angles to the midrib and curving upwards to and along the margin; secondary nerves many, reticulations obscure; petiole .5 in. long, channelled above by the decurrent margins of the blade, densely scaly and ferruginous-pubescent. *Inflorescence* a rather lax, terminal, pyramidal, bi-tri-pinnate, leafy panicle, up to 6 in. long in fruit, shorter in flower, the branches bearing sub-umbellate pedunculate clusters of minute flowers; rachis somewhat flattened, furfuraceous-scaly; branches squarrose; peduncles .5 to .7 in. long; umbel-peduncles .5 in. long; pedicels .2 in. long, often reflexed; bracts leafy, deciduous; bracteoles ovate, very small. *Calyx-lobes* ovate-acute, under .05 in. long, margins scarious ciliate, dotted with large glands.

*Corolla-lobes* slightly longer than calyx-lobes, ovate, glabrous, gland-dotted. *Stamens* as long as corolla-lobes; anthers ovate, apiculate; filaments extremely short. *Ovary* rounded, glabrous; style subulate, rather thick, scarcely exsert. *Berry* red, globose, .15 in. in diam., gland-dotted when dry.

PERAK: Wray 327, 3869; Scortechini 296; King's Collector 8029. Rocks and hilltops at 3,000 to 7,000 feet.

13. *ARDISIA SINUATA*, King & Gamble, n. sp. A shrub or small tree, reaching a height of 10 to 15 feet and a diam. of stem of 2 to 3 in.; branchlets pale brown, sinuate, compressed, with raised lines joining the sides of the bases of the petioles, minutely scaly-pubescent or nearly glabrous. *Leaves* chartaceous; elliptic-oblong, acute or shortly acuminate at apex, rounded or attenuate at base; glabrous above, minutely scaly beneath when young, afterwards glabrate; glandular dots few, scattered; 3 to 6 in. long, 1 to 2 in. broad; midrib slender; main-nerves 10 to 12 pairs, .3 to .4 in. apart, starting from the midrib at an angle of 60° and at once curving upwards to and along the margin; secondary nerves and reticulations faint; petiole .3 to .4 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a lax, terminal, bracteate, nearly glabrous, bi-tri-pinnate panicle 5 to 7 in. long, the branches bearing subumbellate clusters of small flowers; rachis flat, sinuate; bracts leafy, uppermost lanceolate recurved, .5 to 1 in. long; bracteoles minute, ovate; pedicels slender, .1 in. long. *Calyx-lobes* triangular-ovate, glabrous, ciliate, gland-dotted, .04 in. long. *Corolla-lobes* pale green or pink, ovate, acute; margins transparent. *Stamens* nearly as long as corolla-lobes; anthers broadly ovate, shortly apiculate; filaments very short. *Ovary* rounded, glabrous; style slender, exsert, .1 to .15 in. long. *Berry* globose, .15 in. in diam., obscurely striate and black when dry.

PERAK: Wray 2408, 3023; King's Collector 4599.

14. *ARDISIA COLORATA*, Roxb. Hort. Beng. 16 (1814), Fl. Ind. I. 581, and Fl. Ind. Ed. Carey and Wall. II. 271. A large shrub or small tree, reaching 25 feet in height and a girth of 1 foot; branchlets compressed, pale brown, more or less lepidote-scaly, furnished with somewhat zigzag raised lines proceeding downwards from the sides of the bases of the petioles. *Leaves* chartaceous; oblong-lanceolate or elliptic-lanceolate, acute or shortly acuminate at apex, cuneate at base; glabrous on both surfaces, entire; glandular dots many, irregularly scattered, chiefly visible on the upper surface; 5 to 10 in. long, 1.5 to 3 in. broad; midrib prominent beneath, impressed above; main-nerves 20 to 30, also prominently raised beneath and impressed above, usually .3 to .4 in. apart, starting at an angle of 70° to 75° with the midrib, at first straight

then arched upwards to and along the margin; secondary nerves many, slender, 1 to 2 between each pair of main-nerves, reticulations oblique; petiole rather thick, .5 to .8 in. long, channelled above, winged by the decurrent margins of the blade. *Inflorescence* a pyramidal terminal panicle, 4 to 12 in. long, tripinnate, ferruginous scaly, bearing clustered umbellate racemes of flowers; rachis much flattened, as are its branch peduncles; primary branches 2 to 6 in. long, peduncle .5 in., bracts caducous; secondary branches .5 to 1 in. long, peduncles .2 to .4 in., bracteoles small, ovate-acuminate; pedicels slender. .1 to .2 in. long; umbels many-flowered. *Calyx-lobes* ovate, bluntly acute, .05 to .08 in. long, densely gland-dotted, margins scarious and ciliate; tube rather shorter than lobes. *Corolla-lobes* pink, ovate-acute, oblique, unequal, about .15 in. long, not gland-dotted; tube very short. *Stamens* a little shorter than corolla-lobes; anthers sagittate, acuminate; filaments very short. *Ovary* ovoid, glabrous; style thick, .2 in. long. *Berry* globose, .2 to .25 in. in diam., deep red to black, obscurely ribbed when dry, shining. Clarke in Hook. f. Fl. Br. Ind. III. 520; Mez Monog. Myrs. 113. *A. pyramidalis*, Roth Nov. Pl. Sp. 123 (not of Cav.). *A. Rothii*, A. DC. in Trans. Linn. Soc. XVII. 117, Prod. VIII. 126. *A. anceps*, Wall. in Roxb. Fl. Ind. l.c. 280, and Cat. 2261; DC. Prod. l.c.; Kurz in Journ. As. Soc. Beng. XLVI. II. 224, and For. Fl. II. 107; Scheff. Myrs. 77. *A. polycarpa*, Wall. Cat. 2285. *A. grandiflora*, Wall. Cat. 2272.

KEDAH: *Ridley* 5509. PERAK: *Scortechini* 20, 203, 397, 1505, 1568; *King's Collector* 798, 1301, 3099, 3284, 3567, 6473, 6823, 7741, 8252, 10866; *Ridley* 5508. PROVINCE WELLESLEY: *Ridley* 6945. SELANGOR: *Ridley* 7559; *Goodenough* 10551. MALACCA: *Maingay* (K.D.) 1008; *Goodenough* 1762; *Derry* 553, 915, 1075; *Ridley* 1245, 1581, 2817.—DISTRIB. India, Burma, Malay Islands.

VAR. *polyneura*, Clarke in Hook. f. Fl. Br. Ind. III. 520. *Leaves* paler when dry than in the typical form; wide, reaching 4.5 in. in width, sometimes reaching 15 in. in length; more usually elliptic, oblong or obovate, more rounded at base; all nerves more prominent. *Panicle* wide at the base; pedicels much reflexed; rachis very much flattened. *A. polyneura*, Miq. in Pl. Jungh. I. 198, and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 81.

PERAK: *Ridley* 3000; *Scortechini* 1290, 1412; *Wray* 1643, 1950, 2810; *King's Collector* 527, 2152, 2197, 2629, 3643, 3655, 3657, 4119, 4751, 6922, 8640. MALACCA: *Griffith* (K.D.) 3568.—DISTRIB. Java.

VAR. *complanata*, Clarke l.c. *Panicles* smaller, rusty-pubescent; flowers and berries smaller; panicle, rachis, and branches much flattened. *Leaves* usually narrower and smaller, rarely over 7 in. long



and 2·75 in. broad. *A. complanata*, Wall. Cat. 2277; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 210; DC. Prod. VIII. 126; Scheff. Myrs. 78; Miq. Fl. Ind. Bat. II. 1024. *A. sanguinolenta*, Bl. Bijdr. 685 (not of Wall.). *A. Zollingeri*, DC. Prod. VIII. 670.

PENANG: Wallich 2277; Curtis 1052, 22494. PERAK: Wray 2896, 3929; Scortechini 144, 112; King's Collector 7680.—DISTRIB. Chittagong, Java, Sumatra.

VAR. *salicifolia*, King & Gamble. Leaves lanceolate, 5 to 7 in. long, 1 to 1·5 in. broad, glabrous, obscurely gland-dotted; main-nerves not prominent. Panicles spreading, leafy; rachis zigzag, much flattened; bracteoles persistent.

PERAK: Wray 2960; King's Collector 3216, 6816, 8563. MALACCA: Hervey.

VAR. *elliptica*, King & Gamble. Leaves elliptic or elliptic-obovate, acuminate at apex, cuneate at base, glabrous; 4·5 to 8 in. long, 2 to 3 in. broad; main-nerves fewer, 15 to 20 pairs, less prominent. Panicles rather short and stout, 4 to 6 in. long, pyramidal, rachis less flattened, scarcely zigzag.

PERAK: Wray 3293; King's Collector 3326, 3453, 5057, 6473, 6624, 6820, 8856.

15. *ARDISIA CRASSA*, Clarke in Hook. f. Fl. Br. Ind. III. 518 (1882). A small tree; branches pale brown, rounded, stout; branchlets somewhat flattened above and with raised lines from below the base of the petioles. Leaves coriaceous; oblong, acute or slightly blunt-acuminate above, cuneate at base; glabrous and shining above, rufescent and with inconspicuous rounded scales beneath; entire; 4 to 9 in. long, 1·5 to 2·5 in. broad; midrib prominent beneath; main-nerves nearly regular at first, nearly at right angles to midrib, afterwards arching upwards and round parallel to the edge, 20 to 27 pairs, secondary obscure. Inflorescence a terminal rusty-pubescent panicle, 5 to 6 in. long, with remote branches ending in closely packed umbels; rachis thick, much flattened, flexuose; branches first at right angles, then curved, 5 to 8 in. long; pedicels very short, thick; bracteoles ovate, blunt, about 1 in. long. Calyx-lobes thick, ovate-orbicular, 2 in. long, minutely ferruginous-pubescent, overlapping to right; tube about half the length of the lobes. Corolla-lobes broadly ovate, unequal, obliquely and shortly acute, 15 in. long. Stamens shorter than corolla-lobes; anthers ovate, acute; filaments very short, broad at base. Ovary rounded, glabrous; style short, about 1 in. long, subulate. Berry globose, depressed, not striate, 25 in. in diam. Mez Monog. Myrs. 114.

MALACCA: Maingay (K.D.) 1015; Goodenough 1808.—DISTRIB. Borneo.

16. *ARDISIA PLATYCLADA*, King & Gamble, n. sp. A small tree or shrub reaching 10 to 15 feet in height; branchlets pale brown, prominently marked by zigzag raised lines joining the sides of the bases of the petioles; uppermost ones prominently flattened and covered with rusty furfuraceous scales, as are also the young leaves. *Leaves* chartaceous; oblong or elliptic-oblong, abruptly acuminate at apex, attenuate and somewhat rounded at base; both surfaces covered when young with rusty stellate scales, glabrescent when old; margins undulate, recurved; 4 to 6 in. long, 1·5 to 2 in. broad; midrib slender but prominent beneath, impressed above; main-nerves 14 to 18 pairs, 3 to 4 in. apart, rather irregularly parallel, leaving the midrib at an angle of about 65° and joining at 1 to 2 in. from the margin in a very prominent intramarginal looped nerve; secondary nerves and reticulations obscure; petiole none or very short, rarely 2 in. long, rugose, rusty-scaly, and bordered by the decurrent margins of the blade. *Inflorescence* a terminal, compact, bracteate, rusty-scaly, pyramidal, bi-tri-pinnate panicle, 4 to 5 in. long, the flowers in dense subumbellate clusters on the branches; rachis flattened, flexuose; bracts foliaceous, spathulate or oblong-lanceolate, 5 to 1·5 in. long; bracteoles small, triangular-subulate; pedicels glabrous, cernuous, about 1 in. long; buds very small, conical. *Calyx-lobes* pink, lanceolate, 0·4 in. long, ciliate, obscurely red-gland-dotted; tube as long as or rather shorter than the lobes. *Corolla-lobes* waxy-white, ovate-acuminate, 0·7 in. long, slightly gland-dotted; tube very short. *Stamens* shorter than corolla-lobes; anthers ovate, apiculate; filaments very short. *Ovary* rounded, minutely pubescent at top; style straight, 15 in. long, exsert. *Berry* globose, 15 to 2 in. in diam., glandular-rugose, dark blue, black when dry.

PERAK: *Scortechini* 232; *King's Collector* 824, 4569, 5863, 8136, 10140; usually in dense mixed forest.

*A. pterocaulis*, Miq.; Mez Monog. Myrs. 111, a tree of the forests of the Sumatran mountains, much resembles this at first sight, but the leaves are bigger, the flower panicles much larger and more open, with shorter pedicels, and the nerves of the leaves do not meet in a prominent looped intramarginal nerve. (*Forbes* 1992 in Herb. Calc.)

17. *ARDISIA POROSA*, Clarke in Hook. f. Fl. Br. Ind. III. 522 (1882). A shrub, reaching 8 feet in height; branches flexuose, almost zigzag, winged by lines decurrent from the bases of the leaf-petioles. *Leaves* chartaceous; oblong, acute at apex, cuneate at base or sometimes rounded-acute; glabrous, pale beneath; entire, margin often recurved; glands small and obscure; 5 to 9 in. long, 1·5 to 2·5 in. broad; midrib rather slender, prominent beneath; main-nerves obscure, irregular, about

20 to 25 pairs; secondary faint, all arching upwards into an irregular intramarginal ring and reticulate; petiole .4 in. long, narrowly winged by the decurrent blade. *Inflorescence* a loose terminal few-flowered panicle up to 6 in. long; rachis flexuous; branches racemose, at right angles to rachis; peduncles 1 to 1.5 in. long, curving upwards; pedicels .5 to .7 in. long, slender, curved upwards; bracteoles minute, ovate, deciduous; flowers 3-5-, usually 4-merous; buds slender. *Calyx-lobes* ovate, .04 in. long, obscurely dotted; tube short. *Corolla-lobes* ovate-lanceolate, pink, .3 in. long by .1 in. broad, recurved in flower, not dotted but striate. *Stamens* as long as corolla-lobes; anthers very slender, opening by terminal pores as well as longitudinally; filaments very short, thick. *Ovary* conical, gradually passing into a slender style .25 in. long. *Berry* globose, .25 in. in diam., ribbed, glossy black when ripe. Koord. & Val. Bijdr. V. 260; Mez Monog. Myrs. 118.

PERAK: *Scortechini* 116, 1511; *King's Collector* 3108. MALACCA: *Griffith* (K.D.) 3578; *Maingay* (K.D.) 1012; *Wray* 39; *Goodenough* 1528; *Hervey*.

18. *ARDISIA DIVERGENS*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A small tree, reaching 20 feet in height; branchlets slender, smooth, rounded. *Leaves* chartaceous; elliptic or lanceolate, shortly acuminate at apex, rounded at base, drying reddish-brown; glabrous on both surfaces; entire, margins slightly incurved; glandular dots large, prominent, especially near the margin; 3 to 5 in. long, 1 to 2 in. broad; midrib prominent beneath; primary nerves 8 to 12 pairs, irregular, arched and joining in an intramarginal prominent nerve with a smaller, less prominent nerve near the edge; secondary nerves few, slender, reticulate; petiole .15 to .3 in. long, winged by the decurrent blade. *Inflorescence* a loose terminal rusty-pubescent panicle, 2 to 3 in. long, ultimate branches umbelled, 3-5-flowered; main peduncle .5 to 1 in. long, secondary peduncles about .5 in. with lanceolate leafy recurved bracts; pedicels about .4 in. long, thickened above, glandular; bracteoles ovate, deciduous; flowers red, buds short, conical. *Calyx-lobes* rounded, .05 in. in diam., ciliate, conspicuously dotted with few large, transparent, light brown glands; tube short. *Corolla-lobes* ovate, acute, .15 to .2 in. long, unequal in size, and oblique; tube very short, dots very few. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate-acute; filaments very short. *Ovary* ovoid, glabrous, attenuated into a .1 in. long style. *Berry* round, smooth, somewhat depressed, tipped by the persistent style. Wall. Cat. 2269; A. DC. Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 117. *A. punctata*, Jack;

Roxb. Fl. Ind. ed. Carey & Wall. II. 275 (not of Lindl.). *A. punctulosa*, D. Dietr. Syn. Pl. I. 615; Miq. Fl. Ind. Bat. II. 1025.

PENANG: *Jack*; *Wallich* 2269; *Maingay* (K.D.) 1020; *Curtis* 1769.

19. *ARDISIA SUMATRANA*, Miq. Pl. Jungh. I. 195 (1853), Fl. Ind. Bat. II. 1018, and Suppl. 247. A large shrub or small tree, reaching 15 to 20 feet in height and 3 to 4 in. in diam. of stem; branches pale brown, smooth; branchlets minutely ferruginous-scaly. *Leaves* chartaceous; elliptic-oblong or -obovate, rather suddenly acute at apex, acute or cuneate at base; entire, glabrous; glands large, frequent near the margin; 3 to 6 in. long, 1.5 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 12 to 15 pairs, irregularly spaced, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; secondary nerves and innovations indistinct; petiole .3 to .5 in. long, bordered above by the decurrent, often erose, margins of the blade. *Inflorescence* a compact, shortly pyramidal, 3 to 4 in. long, squarrosely bipinnate panicle; common peduncle none or scarcely .5 in. long; bracts minute, triangular; branch peduncles .7 to 1 in. long, minutely ferruginous-scaly as is the rachis; pedicels .2 to .3 in. long, slender; buds ovoid, conical; flowers waxy-white, pedicels and rachis pink. *Calyx-lobes* orbicular, .1 in. broad, ciliate, with scarious margins, much overlapping; glandular dots very few, scattered. *Corolla-lobes* shortly connate, ovate, acute, much twisted, .15 in. long; margins thin, denticulate; glands few, large and brown. *Stamens* about two-thirds the length of the corolla-lobes; anthers ovate-acute, .1 in. long, a few large black glands on the back. *Ovary* ovoid, glabrous; style subulate, .15 in. long. *Berry* bright red at first afterwards black, globose, shining, .2 in. in diam., smooth, faintly striate. *Scheff. Myrs.* 84; *Koord. & Val. Bijdr.* V. 268; *Mez Monog. Myrs.* 121.

PERAK: *King's Collector* 771, 5639, 10836.—DISTRIB. Sumatra, *Beccari* 325, 724; *Forbes* 2083 &c.; Java.

20. *ARDISIA LANCEOLATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A large glabrous shrub or small tree, reaching 15 to 25 feet in height; branches cylindric, pale, smooth; branchlets sometimes fugaciously ferruginous-scaly. *Leaves* coriaceous; elliptic-oblong or -obovate, shortly acuminate at apex, long-cuneate at base; entire or sometimes slightly crenate near the apex; glabrous on both surfaces; glandular dots large scattered, more numerous near the margins; 6 to 11 in. long, 2 to 3.5 in. broad; midrib prominent beneath, impressed above; main-nerves 12 to 15 pairs, oblique, starting at an angle of about 50° with the midrib, and at first more or less parallel, then arching upwards to join in an irregular intramarginal nerve; secondary nerves similar but shorter, reticulations scarcely prominent,

irregular; petiole .5 to .7 in. long, winged by the decurrent blade, the wings overlapping. *Inflorescence* a spreading, terminal or sometimes sub-axillary, panicle, 4 to 6 in. long; rachis flexuose, angular or flattened; branches stout, flattened, swollen at base, bearing corymbose racemes of about 7–8 flowers; pedicels .6 to 1 in. long, stout, narrowly clavate, striate, minutely ferruginous-pubescent; bracteoles small, obtuse, deciduous. *Calyx-lobes* orbicular, .2 in. in diam., enlarged and spreading in fruit, glabrous or slightly pubescent; margins scarious and fimbriate-ciliate, base thickened; glandular dots many, prominent; tube short. *Corolla* ovate acuminate, pink, much twisted in bud, .35 in. long, of which one-third tube; lobes unequal in size, oblique, dots not prominent. *Stamens* large, shorter than corolla-lobes; anthers ovate acute, dehiscent longitudinally, back with few large usually oblong prominent black glands. *Ovary* globose; style .1 to .2 in. long, subulate, twisted. *Berry* globose, depressed, smooth, .25 to .3 in. in diam., black when dry. Wall. Cat. 2292; A. DC. Prod. VIII. 126; Miq. Fl. Ind. Bat. II. 1025; Clarke in Hook. f. Fl. Br. Ind. III. 519; Mez Monog. Myrs. 122. *A. speciosa*, Bl. Bijdr. 684; A. DC. l.c. 133; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 88; Mez Monog. Myrs. 123. *A. purpurea*, Reinw.; Bl. Bijdr. 684; A. DC. l.c. 129; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. 1026; Scheff. Myrs. 88; Koord. & Val. Bijdr. V. 265. *A. Hasseltii*, Blume; Scheff. Myrs. 86; Mez Monog. Myrs. 123. *A. mucronata*, Bl. Bijdr. 685; A. DC. l.c. 126; Scheff. Myrs. 83; Koord. & Val. Bijdr. V. 269; Mez Monog. Myrs. 123. *A. Leschenaultii*, DC. l.c. 133; Miq. Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 89. *A. plagioneura*, Scheff. Myrs. 85; Koord. & Val. Bijdr. V. 268.

PENANG: *Roxburgh*; *Curtis* 2755. PERAK: *Scortechini* 1824; *Wray* 192, 1401, 2480, 2863, 3659; *King's Collector* 2954, 3200, 4528, 4785, 6586, 6785, 8730, 10049. MALACCA: *Griffith* (K.D.) 3569, 3579; *Derry* 512, 1117. JOHORE: *Lake & Kelsall* 4033. SINGAPORE: *Major McNair*; *Cantley* 133; *Ridley* 6136, 6436.—DISTRIB. Java, Sumatra, Borneo, Celebes.

21. *ARDISIA LITTORALIS*, Andr. Repos. X. t. 630 (1811). A glabrous shrub of succulent character, reaching 8 to 10 feet in height; branches thick, rounded; buds lanceolate. *Leaves* succulent-coriaceous; obovate or oblong-obovate, rounded or bluntly acute or almost lanceolate at apex, cuneate at base; entire; glandular dots many, scattered, inconspicuous; 2 to 5 in. long, 1 to 2.5 in. broad; midrib prominent; main-nerves invisible in the fresh plant, obscure when dry, irregular, 13 to 18 pairs, at an angle of about 60° with the midrib, curved upwards to and along the margin; secondary nerves similar, slender, reticulations

obscure; petiole .3 in. long, thick, winged by the decurrent margins of the blade, which are often erose or wrinkled. *Inflorescence* of axillary umbellate racemes of about 8 flowers each, racemes shorter than the leaves, about 2 in. long; common peduncle about 1 in. long, usually recurved; pedicels .3 in. long, enlarged in fruit to .5 in. and then clavate thickened; bracteoles oblong, obtuse, deciduous; flowers rose-coloured, buds conica .4 in. long. *Calyx-lobes* orbicular, .1 in. in diam., ciliate, edges somewhat scarious, elsewhere thickly dotted with black glands, tube rather longer than lobes. *Corolla-lobes* ovate acuminate, oblique, unequal, lineolate and much gland-dotted, .3 in. long; tube short. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, united in a cone, opening longitudinally and obscurely septate in the cells; filaments short, on broad bases confluent into a ring adherent to the corolla-lobes. *Ovary* sub-globose, ending in a subulate style .3 in. long. *Berry* globose, depressed, .2 in. in diam., smooth, bright red, turning purplish-black when ripe; black glands many, small. Kurz For. Fl. II. 110 and Journ. As. Soc. Beng. XLVI. II. 226. *A. obovata*, Bl. Bijdr. 688; DC. Prod. VIII. 132. *A. humilis*, Clarke in Hook. f. Fl. Br. Ind. III. 529 (*not of Vahl. and in part only*); Mez Monog. Myrs. 127, fig. 20, A-E. *A. umbellata*, Roxb. Hort. Beng. 16; Fl. Ind. I. 582; Fl. Ind. ed. Carey & Wall. II. 273; Lodd. Bot. Cat. t. 531. *A. solanacea*, Wall. Cat. 2283A (*part*), 2283D (*not of Roxb.*). *A. polycephala*, Wight Ill. Ind. Bot. t. 145 (*not of Wall.*). *Climacandra obovata*, Miq. Pl. Jungh. I. 199, Fl. Ind. Bat. II. 1030; Scheff. Myrs. 05; Koord & Val. Bijdr. V. 271. *C. littoralis*, Kurz in Journ. As. Soc. Beng. XL. II. 68.

PENANG: Curtis 217; Phillips. PERAK: Wray 1866, 2373; *Scortechini* 1053; *King's Collector* 4960. MALACCA: Griffith; Maingay (K.D.) 1010; Hervey. KELANTAN: Ridley. PAHANG: Ridley 1638. SINGAPORE: Hullett 331, 649; Cantley 153.—DISTRIB. Malay Islands and eastwards to South China and the Philippines; westwards to Ceylon (C.P. 1803) and Travancore (Wight 1767).

*Climacandra multiflora*, Miq., and *C. salicifolia*, Miq., are probably only varieties of this species, which seems to be a coast shrub only.

22. *ARDISIA KUNSTLERI*, King & Gamble, n. sp. A shrub or small tree, usually 6 to 10 feet high, rising sometimes to 20 feet, and with a stem about 2 to 3 in. in diam.; branchlets thick, dark brown, uppermost and innovations rusty-pubescent; leaf-buds lanceolate. *Leaves* coriaceous-chartaceous; elliptic, or elliptic-oblong, shortly acuminate at apex, cuneate at base; minutely pubescent or scaly on both surfaces, afterwards glabrate; entire or obscurely undulate-crenate on the margins

which are somewhat reflexed; glandular dots many, prominent in the areolations of the leaves and along the margins; 8 to 15 in. long, 2·5 to 5 in. broad; midrib slender; main-nerves 20 to 24 pairs, irregularly spaced, starting at an angle of about 65° with the midrib, at first straight then curving upwards to and along the margin where they anastomose; secondary nerves usually one between each pair of main-nerves, reticulations oblique, all raised on the lower surface when dry; petiole 1 to 2·5 in. long, sometimes shorter, thick, channelled above by the decurrent margins of the blade, which are connivent. *Inflorescence* lateral or axillary, a ·5 to ·7 in. long corymbiform minutely pubescent raceme of about 18 to 22 flowers, on a thick flattened peduncle 2 to 4 in. long; bracts small, lanceolate, very early caducous; pedicels slender, clavate, ·7 to 1 in. long, curved upwards in flower downwards in fruit; buds ovoid, ·25 in. long. *Calyx-lobes* orbicular, ·1 in. long, margins scarious ciliate, covered with many black glandular dots; tube shorter than lobes, minutely pubescent without. *Corolla-lobes* dark blue without, pink within, ovate, acute, ·2 in. long, minutely ciliate, prominently dotted, tube ·05 in. long. *Stamens* shorter than corolla-lobes; filaments very short; anthers ovate acuminate, the connective studded on the back with prominent black glands in 2 rows. *Ovary* ovoid, glabrous; style slender, ·15 in. long. *Berry* globose, blueish-black, ·3 in. in diam., faintly striate when dry.

PERAK: *King's Collector* 2207, 2970, 3060, 3264, 4071, 4110, 6486; *Ridley* 9530.

This species is distinguished by its large elliptic leaves, comparatively small flowers, and large fruits, but comes in some respects near to *A. oxyphylla* and in others to *A. solanacea*, and to *A. polycephala*, Wall.

23. *ARDISIA SOLANACEA*, Roxb. Cor. Pl. 27. t. 27 (1795), Hort. Beng. 16, Fl. Ind. I. 580, and Fl. Ind. ed. Carey & Wall. II. 269. A large shrub, reaching 6 to 8 feet in height; bark ash-coloured, branches stout, glabrous, grey, somewhat angular, buds lanceolate. *Leaves* coriaceous; oblong or elliptic-oblong, acuminate at apex, cuneate at base, glabrous, entire; glandular dots many scattered in the areolations of the nerves and especially near the margin; 6 to 10 in. long, 2 to 3·5 in. broad; midrib slender, somewhat impressed above; main-nerves 12 to 20 pairs, unequally spaced, leaving the midrib at an angle of about 60°, at first straight but soon curving upwards to and along the margin and then anastomosing; secondary nerves many, rather prominent as are the reticulations; petiole stout, ·5 to ·8 in. long, channelled above by the decurrent and often connivent margins of the blade. *Inflorescence* of pedunculate corymbiform racemes, bearing 10 to 16 flowers, from the

axils of the upper leaves or of the scars of fallen leaves, 2 to 4 in. long; peduncle 1 to 2·5 in. long, stout, flattened above as is the very short rachis of the raceme; bracteoles concave, thin, prominently gland-dotted; pedicels ·7 to 1 in. long, more or less clavate, slender at first, thicker in fruit; buds conical, ·4 in. long. *Calyx-lobes* orbicular, ciliate, scarious on the margins, ·15 to ·2 in. long, prominently black-gland-dotted; tube nearly equal to lobes. *Corolla-lobes* pink, ovate, rounded, ·3 to ·35 in. long, prominently gland-dotted, minutely ciliate on the margins, otherwise glabrous; tube extremely short. *Stamens* about two-thirds the length of the corolla-lobes; filaments short, stout, conical; anthers ovate-sagittate, ·2 in. long, acute, apiculate, the back of the connective studded with prominent large black glands in a double row. *Ovary* ovoid, glabrous; style slender, ·25 in. long. *Berry* globose, dark blue or black, ·3 in. in diam. Willd. Sp. Pl. I. 1063; Bot. Mag. t. 1677; Wall. Cat. 2283 A-K; Mez Monog. Myrs. 132, fig. 20 F-K; Cooke Bomb. Fl. II. 86. *A. humilis*, A. DC. in Trans. Linn. Soc. XVII. 118 (*not of* Vahl); Wight Ic. t. 1212; Dalz. & Gibs. Bomb. Pl. 137; Clarke in Hook. f. Fl. Br. Ind. III. 529 (*in part*); Brandis For. Fl. 287; Kurz in Journ. As. Soc. XLVI. II. 226, and For. Fl. II. 100; Prain Beng. Pl. 645. *A. elliptica*, Bedd. Fl. Sylv. p. CXXXVIII. (*not of* Thunb.).

PERAK: Wray 1900, 3000; *King's Collector* 6011.—DISTRIB. India, Burma.

VAR. *elata*, King & Gamble. A small tree reaching 25 to 35 feet in height, and 6 to 8 in. in diam. *Leaves* thinner, oblong-lanceolate; main-nerves less prominent than in the type. *Inflorescence* with rather longer stouter peduncles and more numerous flowers. *Berry* slightly larger.

PERAK: *Scortechini* 679; *King's Collector* 4717, 5770.

This variety is scarcely worthy of being classed as such, but, at any rate in the herbarium, the specimens are easily separable.

24. *ARDISIA LURIDA*, Blume Bijdr. 687 (1826). A large shrub, reaching 20 feet in height and 3 to 4 in. in diam. of stem; branchlets thick, glabrous, as are the lanceolate acuminate leaf-buds. *Leaves* entire, coriaceous; lanceolate- or sub-obovate-oblong, shortly acuminate at apex, gradually cuneate at base; glabrous and dark green above, pale and ferruginous-brown beneath; glands many, regularly scattered in the areoles of the net venation; 5 to 10 in. long, 1·5 to 2·5 in. broad; midrib prominent; main-nerves 16 to 20 pairs, slender, irregular, starting at about 60° with the midrib, parallel at first and then arched up to and along the margin where they meet; secondary nerves similar, reticulations obscure; petiole ·4 to ·7 in. long, winged by the decurrent edges of the blade, the



wings connivent above when dry. *Inflorescence* a short (2 to 3 in. long), axillary, few-flowered, sub-umbellate, minutely ferruginous-pubescent, peduncled raceme; peduncles 1 to 1·5 in. long, flattened; pedicels ·4 to ·6 in. in flower, longer in fruit and then clavate; flowers large, waxy, pinkish-white; buds rounded, ·4 to ·5 in. long. *Calyx-lobes* ovate-orbicular, emarginate, scarious and ciliate at the edges, puberulous outside, ·2 in. in diam., glandular dots conspicuous, of various sizes, black and brown mixed; tube short. *Corolla-lobes* ovate, obtuse, oblique, concave and keeled, ·4 in. long, ·2 in. broad, glandular dots and lineoles prominent, tube very short. *Stamens* two-thirds as long as petals; anthers hastate, mucronate, opening by longitudinal slits, prominently dotted on the back with large black glands. *Ovary* rounded, ending in a short subulate style. *Berry* globose, apiculate, ·4 in. in diam., smooth, gland-dotted. A. DC. Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1019; Scheff. Myrs. 71; Koord. & Val. Bijdr. V. 245; Mez Monog. Myrs. 130.

PERAK: Ridley 7172, 10319.—DISTRIB. Java.

25. *ARDISIA OXYPHYLLA*, Wall. Cat. 2291 (1829). A shrub; branchlets rounded, smooth; buds narrowly lanceolate, glabrous. *Leaves* chartaceous; elliptic, acute or shortly acuminate at apex, acutely narrowed at base, entire; glabrous above, glabrous beneath except for a few minute scales; glandular dots many, especially near the margin; 3 to 7 in. long, 1 to 2·5 in. broad; midrib slender, prominent; main-nerves about 16 pairs, irregular, usually at about an angle of 60° with the midrib, more or less parallel at first, then arching nearly to the margin; secondary nerves slender, like the main-nerves, reticulations irregular; petiole ·4 to ·7 in. long, winged by the decurrent margins of the blade. *Inflorescence* an axillary, long-peduncled, short, few-flowered (5 to 8) subumbellate raceme, about 2 to 4 in. long; peduncles 1 to 2 in. long, angular when dry; pedicels ·4 in. long, ·7 in. in fruit, slender; buds rounded, ·3 in. long. *Calyx-lobes* ovate-rotundate, obtuse, ·1 in. in diam., ciliate on the scarious edges, prominently dotted with numerous black and brown glands; tube short. *Corolla-lobes* broadly ovate, sub-acute or obtuse, oblique, ·25 to ·3 in. long, prominently dotted with many black or brown round glands and fewer elongate lineolate ones. *Stamens* nearly as long as corolla-lobes, almost quite sessile; anthers sagittate, long-acute, the connective prominently marked on the back with large black conspicuous glands. *Ovary* rounded, ending in a short ·15 in. long style, glabrous. *Berry* globose, ·3 in. in diam., fleshy, smooth. A. DC. in Trans. Linn. Soc. XVII. 120, Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 528 *variety excepted*; Stapf in Trans. Linn. Soc. Ser. 2. IV. 204; Mez Monog. Myrs. 131.

PENANG : *Wallich* 2291 ; *Curtis* 668 ; *Ridley* 7093. PERAK : *King's Collector* 5624, 5913, 5929, 6185, 8218, 10504. PROVINCE WELLESLEY : *Ridley* 6953.—DISTRIB. Andamans or Tenasserim, *Helper* (K.D.) 3571, 3585 ; Borneo.

26. *ARDISIA SCORTECHINII*, King & Gamble, n. sp. A tree reaching 40 to 50 feet in height and 8 to 12 in. in diam. ; branchlets round, dark brown, lenticellate, leaf-buds acuminate. *Leaves* entire, coriaceous ; obovate, acute at apex, cuneate at base ; glabrous, margins incurved ; glandular dots many, obscure ; 5 to 7 in. long, 1·5 to 2 in. broad ; midrib prominent slender ; main-nerves 14 to 16 pairs, very oblique, at about 30° to the midrib, curved upwards and joining parallel to the margin ; secondary nerves similar but more slender, reticulations curved, surrounding the dots ; petiole 4 in., rather broadly edged by the decurrent margins of the blade, which are nearly connivent above ; stipules leafy, more or less persistent. *Inflorescence* 2 in. long, of short axillary peduncled, umbellate racemes 8–12-flowered, in the axils of short leafy bracts ; peduncles thick, about 1 in. long, flattened ; pedicels 5 in., thickened and longer in fruit ; bracteoles ovate, acute, boat-shaped, deflexed, persistent ; flowers reddish-pink. *Calyx-lobes* orbicular, obtuse, 2 to 25 in. long, emarginate, ciliate, scarious on the edges, with many parallel veins and many prominent round or oblong mixed black and brown glandular dots ; tube short. *Corolla-lobes* ovate, acute, oblique, 35 in. long, unequal, with very few dots, some round some lineolate, tube very short. *Stamens* shorter than corolla-lobes ; anthers long acuminate, villous on the connective on both sides, back marked with large black glands ; filaments short, very thick. *Ovary* ovoid, surmounted by the conical, subulate, 2 in. long, glabrous style. *Berry* globose, smooth, 3 in. in diam., bluish black.

PERAK : *Scortechini* ; *King's Collector* 4662, 4672—on rich soil, in dense jungle, up to 800 feet.

27. *ARDISIA PENDULA*, Mez Monog. Myrs. 125 (1901). Apparently a shrub ; branchlets thick, glabrous below, ferruginous-pubescent at the extremities, leaf-buds lanceolate, ferruginous-pubescent. *Leaves* chartaceous ; elliptic lanceolate, long acute at apex, cuneate at base ; entire but sometimes very faintly crenate near the apex ; glabrous above, glabrous or slightly ferruginous-pubescent beneath ; glandular dots scattered, more numerous and prominent near the margins ; 4 to 7 in. long, 1·5 to 2 in. broad ; midrib slender ; main-nerves 10 to 12 pairs, irregular, starting from the midrib at about an angle of 60°, then arching upwards and joining near the margin ; secondary nerves slender, minor nerves reticulate ; petiole 3 to 5 in. long, winged by the decurrent edges of the blade. *Inflorescence* of 3 to 5 in. long axillary peduncled ferruginous-

pubescent racemes; peduncles about 2 in., pedicels .4 to .5 in. long, curved. *Calyx-lobes* ovate, rounded, with many glandular dots, .1 in. long; tube short. *Corolla-lobes* ovate-elliptic, rounded, much gland-dotted. *Stamens* shorter than the petals; anthers acute, dotted on the back; filaments very short. *Ovary* ovoid, glabrous. *Berry* globose, black when dry, .25 in. in diam., much gland-dotted. *A. attenuata*, Miq. Fl. Ind. Bat. II. 1020 and Suppl. I. 575 (*not of* Wall.); Scheff. Myrs. 68. *A. reclinata*, Blume; Scheff. l.c.

MALACCA: *Goodenough* 1295.—DISTRIB. Java, Sumatra. A poor specimen only available.

28. *ARDISIA HULLETTII*, Mez Monog. Myrs. 130 (1901). Apparently a shrub; branchlets light brown, round, smooth; leaf-buds lanceolate, glabrous, black. *Leaves* membranous; oblong-lanceolate, acuminate at apex, acuminate narrowed at base; entire, glabrous on both surfaces; glands light-brown, large, in the areoles of beautifully netted venation; 4 to 7 in. long, 1.5 to 2 in. broad; midrib slender; impressed above; main-nerves many, slender, irregular, 20 to 24 pairs, parallel at first and then arching upwards and joining in a narrow intramarginal ring; secondary nerves many, like the main-nerves, reticulations numerous; petiole .4 in. long, slender, only very narrowly winged. *Inflorescence* an axillary, short, few- (1-5) flowered, glabrous, umbellate raceme, peduncle .5 to .7 in. long; pedicels .5 in. long, recurved, more or less clavate; buds conical, .3 to .4 in. long. *Calyx-lobes* scarcely overlapping, ovate-orbicular, ciliate, .1 to .15 in. long, minutely gland-dotted; tube short. *Corolla-lobes* ovate-acuminate, upper edges incurved, oblique, unequal, many-nerved, sparsely black-gland-dotted; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers oblong, mucronate, with 2 lines of prominent black glands on the back; filaments short, spreading at base. *Ovary* ovoid, thick, glabrous; style short, subulate. *Berry* brown, smooth, globose, .2 in. in diam., seed white-ringed at base.

MALACCA: on Mount Ophir, *Hullett* 769, 778.

29. *ARDISIA OBLONGIFOLIA*, King & Gamble, n. sp. A shrub; branchlets brown, glabrous, with faint decurrent raised lines from either side of the insertion of the leaf-petioles; leaf-buds lanceolate acuminate. *Leaves* chartaceous; oblong, acute at apex, cuneate at base; glabrous, entire; glandular dots scattered but not prominent except near the margins which are reflexed; 7 to 10 in. long, 2 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 22 to 26 pairs, starting at an angle of nearly 80° from the midrib, at first straight and near the margin curving upwards to and along it; secondary nerves many, usually at least 1 to 2 between each pair of main-nerves, reticulations in an elegant network;

petiole rather slender, .8 to 1 in. long, bordered above by the decurrent margins of the blade. *Inflorescence* an axillary corymbose raceme of about 8 flowers and about .5 in. long on a 1.5 to 2 in. long flattened peduncle; pedicels .75 in. long, clavate. *Calyx-lobes* orbicular, ciliate, gland-dotted, about .1 in. long; tube as long: rest of flowers unknown. *Berry* globose, .2 in. long, glandular-dotted.

PERAK: at 1,000 feet, *Wray* 3797.

30. *ARDISIA TETRASEPALA*, King & Gamble, n. sp. A shrub; branchlets slender, pale brown, with indistinct raised lines from the sides of the leaf-petioles, sinuate, slightly scaly above. *Leaves* chartaceous; elliptic or elliptic-ovate, gradually acuminate at apex, rounded at base; glabrous above, pale brown when dry, very slightly pubescent on and near the midrib beneath; glandular dots many scattered, prominently raised on the upper surface, margins slightly recurved; 4.5 to 6.5 in. long, 1.5 to 2.5 in. broad; midrib prominent below; main-nerves about 16 to 20, irregularly spaced, starting at an angle of 60° from the midrib, curved upwards, dividing and anastomosing with the secondary nerves in a marginal network, all raised beneath; petiole .2 to .3 in. long, channelled above. *Inflorescence* a pseudo-terminal subumbellate 8-12-flowered scarcely .2 in. long raceme in the axil of the uppermost leaf; peduncle about .5 in. long, pedicels slender, about .5 in. long. *Calyx-lobes* 4, ovate-orbicular, ciliate, gland-dotted, about .1 in. long, reflexed in fruit: rest of flower unknown. *Berry* globose, .25 in. in diam., black when dry and prominently dotted with oblong glands.

JOHORE: at Jaffaria and Gunong Palai, 1,500 feet, *G. King*.

We place this species in *TINUS* instead of in *TINOPSIS* because not only does the inflorescence seem to be only apparently terminal but its sub-umbellately racemose character seems to approximate more nearly to that of the former section.

31. *ARDISIA BIFLORA*, King & Gamble, n. sp. A small shrub, 4 to 8 feet high; branches smooth, pale brown; branchlets divaricate, slender. *Leaves* chartaceous; oblong-lanceolate, acuminate at both apex and base; glabrous; entire or very faintly crenulate; glandular dots many, black, large, in the areoles of the reticulations; 3 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 12 to 14 pairs, at an angle of about 55° with the midrib, curving upwards to and along the margin where they meet in a wavy intramarginal nerve; secondary nerves many, reticulations irregular; petiole slender, .2 to .5 in. long, sometimes longer. *Inflorescence* a lateral, 2-flowered, pedunculate umbel, 1.5 in. long; peduncle and pedicels each .75 in. long, slender. *Calyx-lobes* ovate, scarious and ciliate on the margins, prominently gland-dotted, .05 in. long; tube as long: rest of flower unknown. *Berry*

black, globose, .25 in. in diam., ribbed and prominently gland-dotted.

PERAK : in dense jungle on limestone hills at 300 to 800 feet, *King's Collector* 4296, 4711 ; *Wray* 3343. It is very near *A. paupera*, Mez, of Sumatra, but the long slender peduncle and pedicels distinguish it.

A specimen collected by Scortechini (without number) has similar leaves, but the inflorescence is pseudo-terminal and branched, with more than 2 flowers and very short pedicels.

Ridley's No. 2670 from Pahang seems to be *Ardisia rhyncophylla*, Clarke, but the specimen is imperfect, and we hesitate to describe it as a Malay plant.

32. *ARDISIA TAHANICA*, King & Gamble, n. sp. A shrub (?) ; branchlets brown, shining, somewhat flattened ; innovations scaly and hirsute, leaf-buds ferruginous-pubescent, lanceolate. *Leaves* chartaceous ; linear-lanceolate, acuminate at both ends ; glabrous above, scaly beneath and slightly pubescent along the midrib ; margins entire, recurved ; glandular dots numerous, scattered, conspicuous on the under surface ; 4 to 6 in. long, .7 to .9 in. broad ; midrib slender ; main-nerves obscure, about 12 pairs, starting at a very oblique angle and curving upwards to and along the margin ; secondary nerves similar, reticulations obscure ; petiole slender, .4 to .6 in. long. *Inflorescence* an umbellate peduncled raceme, 1.5 to 2 in. long, from the axils of some of the upper leaves ; peduncle slender, .7 to 1.2 in. long ; flowers about 5-8, pedicels slender, .5 in. long. *Calyx-lobes* semi-orbicular, scarious and ciliate on the margins, rusty-pubescent on the back and with many glandular dots, .05 in. long ; tube as long as lobes : rest of flower not seen. *Berry* globose, depressed, .2 in. in diam., prominently striate.

PAHANG : *Ridley* 2669, in Tahan woods.

*Goodenough* No. 10552, from Selangor, is also possibly the same species, but the leaves reach 1.5 in. in breadth and the peduncle and pedicels are stouter.

33. *ARDISIA VILLOSA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 582, and Fl. Ind. ed. Carey & Wall. II. 274. A small shrub, reaching 6 to 8 feet in height ; branchlets rounded, from nearly glabrous to densely ferruginous-pilose, the hairs moniliform. *Leaves* chartaceous ; oblong-lanceolate or lanceolate, acute or acuminate at apex, cuneate at base ; more or less distinctly but shallowly crenate, the crenations broad, margins recurved ; glabrous to minutely rusty-hirsute above, densely red-villous beneath, especially on the nerves ; glandular dots many, black, prominent ; 4 to 8 in. long, .75 to 2.5 in. broad ; midrib prominent ; main-nerves 8 to 12 pairs, very irregular, slender, obscure, arching upwards and ending in the crenature-glands ; secondary nerves similar, meeting the main-nerves, reticulations faint ; petiole .4 to .8 in.

long, rusty-villous. *Inflorescence* a sessile or short-peduncled, more or less rusty-villous, umbellate raceme at the end of the main branchlets or at the ends of long-peduncled axillary 2-leaved branchlets; bracts ovate-lanceolate, .1 to .2 in. long, deciduous; pedicels .3 to .4 in. long, secund; buds conical. *Calyx-lobes* pink, linear-oblong or lingulate, obtuse or slightly acute, .25 to .3 in. long, .075 in. broad, glabrous to thickly rusty-villous, apex often recurved, glandular lines and dots scattered; tube exceedingly short. *Corolla-lobes* pale pink, ovate-acute or -acuminate, .25 to .3 in. long, prominently dotted with round or oblong glands, much twisted in bud; tube short. *Stamens* shorter than the petals, .2 in. long; anthers ovate, acuminate, dehiscing by wide pores in the upper half; filaments very short. *Ovary* globose, crowned by a slender .2 in. long style, the base of the style and top of ovary minutely pubescent. *Berry* globose, .25 in. in diam., bright red, sparingly pubescent. A. DC. Prod. VIII. 136; Wall. Cat. 2280A; Miq. Pl. Jungh. 191, Fl. Ind. Bat. II. 1017; Scheff. Myrs. 90; Kurz in Journ. As. Soc. Beng. XLVI. ii. 227 and For. Fl. II. 113; Clarke in Hook. f. Fl. Br. Ind. III. 525 *var. excepted*; Koord. & Val. Bijdr. V. 253. *A. vestita*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 274; A. DC. l.c.; Miq. l.c.; Mez Monog. Myrs. 141. *A. mollis*, Bl. Bijdr. 689. *A. tavoyana*, A. DC. in Trans. Linn. Soc. XVII. 125.

PENANG: *Maingay* (K.D.) 1011; *Ridley* 9357; *Curtis* 1597. PERAK: *Scortechini* 638; *Wray* 151, 862, 2967, 3149; *King's Collector* 1819, 3138, 6104, 6448, 7915, 10052. PAHANG: *Ridley* 2176. SELANGOR: *Ridley* 1558; *Curtis*. MALACCA: *Griffith* (K.D.) 3588; *Hervey*; *Ridley*; *Cuming* 2390. SINGAPORE: *Ridley*, 2833, 2816.—DISTRIB. Burma, Sumatra, Java, Borneo, and eastwards to Tonkin and Hainan.

VAR. *glabrata*, Kurz l.c. *Leaves*, at least when full grown, glabrous. *Calyx* glabrous or nearly so. Stapf in Trans. Linn. Soc. Ser. 2, IV. 204. *A. glabrata*, Bl. Bijdr. 692; A. DC. Prod. VIII. 136; Miq. Fl. Ind. Bat. II. 1022.

PERAK: *Ridley* 2899; *Wray* 2801, 3414; *King's Collector* 949, 4612, 6188, 6255, 7696; *Scortechini* 315.—DISTRIB. Java, Sumatra, Borneo.

*Ridley's* 5510 from Kedah seems to be a form of this with smaller leaves and shorter calyx-lobes, but can hardly be separated as a second variety.

34. *ARDISIA VIRENS*, Kurz For. Fl. II. 575 (1877), and Journ. As. Soc. Beng. XLVI. ii. 226. A small glabrous shrub; branchlets slender, pale, somewhat compressed and twisted. *Leaves* membranous, oblong or oblong-lanceolate, acuminate at apex, cuneate at base; faintly

crisped-crenulate with large glands in the crenulations; pale and glabrous on both surfaces; glandular dots scattered, in the areoles of the reticulations; 4 to 6 in. long, 1.5 to 2 in. broad; midrib prominent, somewhat impressed above; main-nerves about 12 to 14 pairs, irregular and irregularly spaced, usually starting at an angle of about 60° with the midrib, at first straight, branching and joining in an intramarginal nerve close to the margin and passing through the crenature glands; secondary nerves many, slender, reticulations many, curved; petiole .4 to .6 in. long, winged by the decurrent margins of the blade. *Inflorescence* an almost sessile terminal corymb, composed of long-peduncled sub-umbellate racemes; peduncles 1 to 1.5 in.; pedicels .5 to .8 in. long; buds conical .25 in. long. *Calyx-lobes* oblong, obtuse, thin, .075 in. long, conspicuously dark-brown-gland-dotted; tube short. *Corolla-lobes* ovate, bluntly acuminate, oblique, unequal, conspicuously marked by few dark brown lines and dots, .3 in. long; tube very short. *Stamens* shorter than corolla-lobes, .2 in. long, obtusely hastate; anthers opening by broad longitudinal slits, conspicuously black-gland-dotted on back; filaments short. *Ovary* rounded, style slender, .2 in. long. *Berry* globose, pale, somewhat depressed, .3 to .4 in. in diam., conspicuously marked with round or oblong purple dots, somewhat fleshy. Clarke in Hook. f. Fl. Br. Ind. III. 524; Stapf in Trans. Linn. Soc. Ser. 2, IV. 203; Mez Monogr. Myrs. 147.

PERAK: *Wray* 1444 at 2,000 feet.—DISTRIB. Assam, Cachar, Manipur, Yunnan, Borneo.

35. *ARDISIA WRAYI*, King & Gamble, n. sp. A single-stemmed treelet or shrub reaching 5 feet in height, but usually smaller; upper part of stem .25 in. thick, brown, with spongy bark and scurfy scales; leaf-buds glabrous, lanceolate-acuminate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, long cuneate at base; margins recurved; somewhat scaly on both surfaces, scurfy along the midrib beneath; glandular dots prominent scattered; broadly crenate, the crenatures shallow with large glands; deep green above, red or purple beneath; 6 to 10 in. long, 1.5 to 3 in. broad; midrib slender; main-nerves 12 to 20 pairs, irregular in angle and distance, curving upwards to and along the margin where they or their branches end in the glands of the crenatures; secondary nerves few, reticulations many scarcely prominent; petiole .7 to 1.3 in. long, somewhat flattened, bordered by the decurrent margins of the blade. *Inflorescence* of glabrous sub-umbellate racemes from the axils of the uppermost leaves, usually crowded so as to present almost the appearance of a terminal cluster; peduncles usually .5 in. long, occasionally shorter but often longer, even up to 2 in., flattened; racemes very short, much marked by the scars of very

caducous bracteoles; flowers 8 to 12; pedicels slender below, flattened above, twisted and curved, .3 to .4 in. long; buds ovoid. *Calyx-lobes* ovate, acute, .1 in. long, prominently black-gland-dotted. *Corolla-lobes* waxy, reddish or purple, ovate, .15 to .2 in. long, sparsely gland-dotted. *Stamens* nearly as long as corolla-lobes; filaments very short, thick; anthers ovate, acute, connective much gland-dotted on back. *Ovary* rounded; style short, slender, glabrous. *Berry* globose, red, rugose, .3 in. in diam., prominently gland-dotted when dry.

PERAK: Wray 438, 2795, 3280, 4051; *Scortechini* 418; *King's Collector* 1888, 3631, 6938, 7514, in dense jungle on rich soil, both in low-level localities and up to 4,000 feet in the mountains; one specimen, rather more slender, thinner and more glabrous, from the top of rocks (K.C. 7514).

K.C. No. 6938 from mountains at 3,000 to 4,000 feet, has the main-nerves nearly at right angles to the midrib, while other specimens have it at 60° or even 45°; these are, however, intermediate, and all that can be said is that the character is a variable one. The species seems to resemble the *A. macrocarpa*, Wall., of Northern India, in its habit of growth.

36. *ARDISIA MINOR*, King & Gamble, n. sp. Apparently a short (12 to 18 in. high) treelet or undershrub; lower part of stem with side rootlets; stem .2 to .25 in. thick, rusty-pubescent, dark brown. *Leaves* coriaceous; elliptic, long caudate-acuminate at apex, attenuate or cuneate at base often unequally; margins recurved, very shallowly crenate, the crenatures with large prominent glands; glabrous on both surfaces but somewhat scaly; 5 to 7 in. long, 2 to 2.5 in. broad; midrib slender; main-nerves about 15 pairs, starting at an angle of about 50° with the midrib, and thence straight to the margin where they or their branches end in the crenature glands; secondary nerves similar to the main-nerves, reticulations oblique, all raised beneath when dry; petiole thick, rugose, rusty-pubescent, .7 to 1 in. long, winged by the decurrent margins of the blade. *Inflorescence* of very short, rusty-pubescent, umbellate racemes of about 5 to 6 flowers from the axils of the uppermost leaves; peduncle scarcely .2 in. long, thick; racemes about .2 in. long; bracteoles many, ovate or oblong, recurved; pedicels thick, .3 to .4 in. long, flattened, recurved. *Calyx-lobes* ovate acute, .1 to .15 in. broad, glabrous, prominently gland-dotted, nearly free. *Corolla-lobes* ovate acute, .2 in. long, glabrous, dotted prominently with large black glands. *Stamens* shorter than corolla-lobes; filaments very short, thick; anthers oblong acuminate, the connective gland-dotted at the back, .1 in. long. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Berry* not known.



PERAK: *Scortechini*.

Very near *A. Wrayi*, but differs especially in the coriaceous leaves and the shorter and much thicker pedicels.

37. *ARDISIA PERAKENSIS*, King & Gamble, n. sp. A small bush; branchlets pale brown, smooth, wrinkled when dry; innovations densely rusty-glandular-pubescent. *Leaves* membranous; elliptic-lanceolate, long acute both at apex and base; nearly glabrous on both surfaces but with small peltate scales, young leaves rusty-glandular-pubescent; margin slightly recurved, shortly and shallowly crenate or nearly dentate except on the lower third and at the apex, glands in the crenatures present, obscure; glandular dots absent or very sparse; 2·5 to 4 in. long, ·75 to 1·25 in. broad; midrib slender; main-nerves about 16 pairs, rather irregular in angle and distance, meeting near the margin in an irregularly looped intramarginal nerve, reticulations many, transverse, all raised on lower surface; petiole slender, ·2 to ·4 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of small, 2–3-flowered, rusty-glandular, pubescent, pedunculate umbels from the axils of upper leaves or of reduced bract-like leaves; peduncles ·3 in. long; pedicels ·1 to ·2 in. long; bracteoles ovate, minute; buds ovoid, pale pink. *Calyx-lobes* triangular-ovate, acute, minutely pubescent and gland-dotted, ·05 in. long. *Corolla-lobes* ovate, acute, ·1 to ·15 in. long, glabrous, sparsely black-gland-dotted. *Stamens* a little shorter than corolla-lobes; filaments almost none; anthers ovate, acute, ·1 in. long. *Ovary* rounded, glabrous; style subulate, ·075 in. long. *Berry* not known.

PERAK: at 300 feet in Upper Perak, *Wray* 3462.

38. *ARDISIA MEZIANA*, King & Gamble, n. sp. A herbaceous under-shrub, 1 to 2 feet in height, stem 2 in. in diam.; bark soft, pale brown, upper parts and innovations rusty-glandular pubescent. *Leaves* chartaceous; elliptic-obovate, shortly and abruptly acuminate at apex, cuneate at base; glabrous above, sparsely glandular-pubescent beneath; margins rather narrowly crenate-dentate except in the lower third to half and at the acumination, recurved, glands in the crenatures obscure; glandular dots many, scattered, inconspicuous; 3·5 to 5·5 in. long, 1·5 to 2 in. broad; midrib slender; main-nerves 10 to 14 pairs, at an angle of about 60° with the midrib, at first straight afterwards curved upwards to anastomose near the margin; secondary nerves few, reticulations oblique, all more or less raised on both surfaces when dry; petiole ·3 to ·5 in. long, somewhat thickened below, densely rusty-glandular-pubescent. *Inflorescence* of very short, sessile, rusty-glandular-pubescent racemes of about 6 flowers each, in the axils of the leaves all

down the stem, the racemes .1 to .15 in. long; bracteoles ovate, scarious, conspicuously black-gland-dotted and ciliate; pedicels short, .1 to .15 in. long, stout; buds ovoid; flowers waxy-white. *Calyx-lobes* 5, ovate, acute, ciliate, hyaline, with conspicuous black dots, .05 in. long; tube as long as lobes. *Corolla-lobes*, ovate, blunt, .1 in. long, conspicuously black-gland-dotted; tube very short. *Stamens* nearly as long as corolla-lobes; filaments short, thick; anthers ovate-lanceolate, long apiculate, the connective studded on the back with large black glands. *Ovary* rounded, style filiform as long as corolla. *Berry* not seen.

PERAK: on limestone rocks in open jungle at 500 to 800 feet, *King's Collector* 5838.

We have dedicated this well-marked species to C. Mez, whose Monograph of MYRSINÆ has done so much for the elucidation of the Natural Order, and whose study of *Ardisia* in particular has been of so much help to us.

39. *ARDISIA RIDLEYI*, King & Gamble, n. sp.: A slender shrub or treelet, reaching 10 to 15 feet in height and about 1 in. in diam.; branchlets dark brown, slender, minutely ferruginous-pubescent; leaf-buds lanceolate, densely ferruginous-pubescent. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, acuminate or somewhat rounded at base; prominently crenate, the crenatures usually regular, margin slightly recurved; glabrous on both surfaces; glandular dots few, scattered; 4 to 8 in. long, 1.25 to 1.75 in. broad; midrib slender; main-nerves about 12 pairs, at irregular angles and spaces, ending in the crenatures of the margin; secondary nerves and reticulations obscure; petiole .2 to .7 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 3-6-flowered, sessile, umbellate raceme in the axil of the uppermost leaf of the branchlets; raceme about .2 in. long; pedicels slender, .7 to 1.4 in. long, minutely rusty-pubescent; buds ovoid, acute. *Calyx-lobes* 5, broadly triangular, acute, .075 in. long, sparsely black-gland-dotted, rusty-pubescent. *Corolla-lobes* broadly ovate, acute, .15 in. long, glabrous, densely and closely black-gland-dotted. *Stamens* a little shorter than the corolla-lobes; filaments very short, thick; anthers oblong, hastate, mucronate, .1 in. long. *Ovary* rounded, glabrous, style slender, .05 in. long. *Berry* dark red, ovoid, apiculate, sparsely striate and gland-dotted, .25 to .3 in. in diam.

PERAK: in dense forest at 2,500 to 4,500 feet, *Wray* 209; *King's Collector* 5019. SELANGOR: *Ridley* 8534. SINGAPORE: *Ridley* 6434.

Very like *A. crenata* var. *angusta* but has broader and thinner leaves, differently nerved.

40. *ARDISIA CRENATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583,

and Fl. Ind. ed. Carey & Wall. II. 276. An evergreen small glabrous shrub; branchlets thick, somewhat fleshy, striate with faint lines decurrent from the bases of the leaves; leaf-buds small, conical. *Leaves* chartaceo-coriaceous; lanceolate to oblong-lanceolate, acute or sub-obtuse at apex, acuminate narrowed at base; margins crispately crenate with glands in the crenatures, recurved; glabrous on both surfaces; glandular dots scattered in the areoles of minor nerves, sometimes prominent, often obscure; 2 to 4 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 10 to 14 pairs, irregular, slender, arching upwards and joining in an intramarginal nerve close to the margin which passes through the crenature glands; secondary nerves similar but fainter, reticulations curved; petiole .2 in. long, narrowly winged by the crisped edges of the decurrent blade. *Inflorescence* of short, sessile or shortly peduncled, paniced racemes, springing from the branchlets just below the terminal pair of leaves; pedicels .2 to .4 in. long, slender, longer and thicker in fruit, generally recurved; buds conical, .15 to .2 in. long; flowers 4- or 5-merous, waxy pink or white. *Calyx-lobes* ovate, .05 to .1 in. long, scarious at the edges, dotted with black glands in the middle; tube very short. *Corolla-lobes* rose-pink, ovate-oblong, bluntly acuminate, .2 in. long, oblique, unequal, sparsely dotted with round or elongated glands, sometimes papillose at the base within. *Stamens* shorter than corolla-lobes; anthers ovate-oblong, acute, with few glands on the back; filaments very short. *Ovary* ovoid, surmounted by a twisted subulate slender style .15 in. long. *Berry* globose, .25 in. in diam., scarlet, succulent, obscurely striate, crowned by the persistent style. Wall. Cat. 2262; Bot. Mag. t. 1950; Clarke in Hook. f. Fl. Br. Ind. III. 524; Koord. & Val. Bijdr. VI. 190. *A. glandulosa*, Bl. Bijdr. 690 (not of Roxb.). *A. crenulata*, Lodd. Bot. Cat. t. 2 (not of Vent.). *A. crispa*, A. DC. in Trans. Linn. Soc. XVII. 124 and Prod. VIII. 134; Scheff. Myrs. 72; Miq. Fl. Ind. Bat. II. 1020; Kurz in Journ. As. Soc. Beng. XLVI. ii. 226 and For. Fl. II. 113; Mez Monog. Myrs. 144, fig. 22. *A. densa* and *A. polysticta*, Miq. Fl. Ind. Bat. Suppl. 575, 576. *Bladhia crispa*, Thunb. Fl. Jap. 97; Kaempf. Ic. Pl. Jap. t. 7.

KEDAH: Ridley 5517. PENANG: Wallich 2262; Maingay (K.D.) 1009; Phillips; Curtis 337; Deschamps; G. King; J. Scott. MALACCA: Griffith (K.D.) 3583/1; Cuming 2254; Hullett 637; Derry 944. PERAK: Scortechini; Wray, 1257; King's Collector 1337, 4180, 4903, 7847 8706, 10566. SELANGOR: Ridley 10553. PAHANG: Ridley 24; Havi-land. JOHORE: Fox 11285.—DISTRIB. Assam, Burma, Sumatra, Java, Borneo, and eastwards to South China and Japan. Ridley (Trans. Linn. Soc. III. (1893) 317) says the berries are "sweet and eatable."

VAR. *angusta*, Clarke, l.c. *Leaves* narrowly lanceolate; flowers in a simple umbellate raceme, pedicels divaricate, buds obtuse.

MALACCA : Griffith (K.D.) 3584.

41. *ARDISIA ROSEA*, King & Gamble, n. sp. A small shrub reaching 4 to 6 feet in height; branchlets divaricate, purplish-brown when dry, glabrous; buds lanceolate. *Leaves* membranous; elliptic, cuspidately acuminate at apex, cuneate at base; broadly crenate with shallow crenatures and prominent glands, the margin recurved; glabrous on both surfaces; glandular dots extremely numerous, prominent on the under surface which is paler than the upper when dry; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves obscure, 8 to 12 pairs, irregular, branching and usually ending in the crenature-glands; secondary nerves and reticulations indistinct; petiole red, slender, .25 to .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a corymbiform terminal or pseudo-terminal panicle of umbellate racemes, the branches divaricate, minutely rusty-pubescent; common peduncle, above the last leaf, short, about .05 in.; branch peduncles slender, .5 to 1 in. long; pedicels slender, .2 to .4 in. long, up to .5 in. long in fruit, flattened in flower; flowers in each umbel about 12, usually recurved; buds ovoid, acute. *Calyx-lobes* 5, triangular-ovate, .05 in. long, glabrous, not glandular; tube as long as lobes, lobes reflexed in fruit. *Corolla-lobes* waxy-white tinged with pink, or pink only, ovate-acuminate, .2 in. long, much twisted to the left, not glandular. *Stamens* nearly as long as corolla-lobes; filaments slender, .05 in. long; anthers ovate, blunt, .1 in. long, with very few glands. *Ovary* rounded, glabrous; style filiform, .15 in. long. *Berry* black, globose, .25 in. in diam., smooth, tipped with the long slender persistent style.

PERAK : Wray 32, 402; Scortechini 295, 664; Ridley 5511, 9720; King's Collector 3247, 6247, 8057; in dense forests in the mountains from 3,000 feet elevation to the top of Gunong Batu at 6,700 feet.

42. *ARDISIA LONGEPEDUNCULATA*, King & Gamble, n. sp. A shrub; branchlets slender, rusty-pubescent, divaricate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, attenuate at base; crenulate with shallow glandular crenatures, margin recurved; glabrous on both surfaces, pale beneath when dry; glandular dots many, scattered, prominent on the under surface when dry; 4 to 6 in. long, 1.25 in. broad; midrib slender; main-nerves 12 to 16 pairs, curved upwards to and along the margin usually to end in the crenature-glands; secondary nerves and reticulations obscure; petiole slender, .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a terminal

pyramidal panicle of long-peduncled racemes, 5 to 6 in. long and 6 to 9 in. broad, branches and rachis all rusty-pubescent; common peduncle about 1 in. long; branch peduncles 2 to 3 in. long, at right angles to the rachis and curved upwards; racemes about .5 in. long, about 8-flowered; pedicels slender, somewhat clavate, twisted, .5 to 1 in. long; bracteoles subulate, caducous; buds ovoid, acuminate. *Calyx-lobes* triangular, blunt, .05 in. long, rusty-pubescent; tube as long. *Corolla-lobes* pink, ovate, long acuminate, .25 in. long, rusty-pubescent within, not gland-dotted; tube very short. *Stamens* much shorter than corolla-lobes; anthers oblong, acute; filaments very short. *Ovary* rounded, style subulate, .25 in. long. *Berry* purplish-black, globose, .2 in. in diam.

PERAK: at low levels, *Wray* 296.

43. *ARDISIA MAINGAYI*, King & Gamble. A "bush or small tree" (*Wray*), "slender tree" (*Scortechini*); branchlets smooth, bark brown, pith rather small; innovations glandular-pubescent. *Leaves* membranous; sub-opposite or falsely whorled; elliptic-obovate or obovate-lanceolate, attenuately or abruptly acuminate at apex, attenuately cuneate at base; glabrous on both surfaces except for a few scattered glandular hairs, pale beneath; margin finely toothed except on the lower third, the teeth caudate and glandular; 6 to 11 in. long, 2 to 3.5 in. broad; midrib slender above, thickened below; main-nerves 15 to 20 pairs, irregular in angle and distance, but usually at about 50° with the midrib, straight for about half-way and then curved to and along the margin; secondary nerves and reticulations very faint; petiole none or very short, the base of the leaf almost half stem-clasping. *Inflorescence* of slender, 6 to 8 in. long, sparsely glandular-pubescent, panicles of long peduncled sub-umbellate racemes, from the axils of upper leaves, of abortive leaves, or of the scars of fallen leaves below them; common peduncle slender, 2 to 3 in. long; branch peduncles very slender, divaricate, .5 to 1.5 in. long, supported by linear subulate .2 to .3 in. long bracts; racemes .3 to .5 in. long, 8-12-flowered; bracteoles small, subulate; pedicels slender, flattened above; buds ovoid acute. *Calyx-lobes* ovate, obtuse, .05 to .1 in. long, recurved in fruit, minutely pubescent, ciliate on the margins. *Corolla-lobes* white, ovate, acute or acuminate, .15 in. long, glabrous, gland-dotted. *Stamens* much shorter than corolla-lobes; filaments short, dilated at base; anthers oblong, bluntly mucronate, .1 in. long. *Ovary* rounded, glabrous; style slender, .05 in. long. *Berry* red, .3 in. in diam., longitudinally ribbed when dry. *A. odontophylla*, Wall., var. *Maingayi*, Clarke in Hook. f. Fl. Br. Ind. III. 526.

PERAK: *Wray* 304, 953, 1597; *Scortechini* 335, 339; *Curtis*.

MALACCA : *Maingay* (K.D.) 1016, in the mountains about 4,500 feet and below.

Although Wray and Scortechini describe this more or less as a "tree," *Maingay's* specimen is that of a semi-herbaceous undershrub about 24 in. high, sending out roots from above the ground-level.

44. *ARDISIA THEÆFOLIA*, King & Gamble, n. sp. A small shrub reaching 3 feet in height; branchlets brown, smooth, the uppermost parts and innovations rusty-glandular-pubescent. *Leaves* chartaceous; elliptic, long acuminate at apex, acuminate at base; alternate or sub-opposite or falsely whorled; minutely glandular-pubescent on both surfaces, scaly beneath; margins recurved, finely toothed except on the lower third and on the acumination, the teeth erect, glandular; glandular dots very numerous and prominent on both surfaces; 2 to 3 in. long, .7 to 1.2 in. broad; midrib slender; main-nerves 10 to 14 pairs, close, curved upwards to near the margin, reticulations obscure; petiole .4 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 1.5 to 2.5 in. long panicle with short racemose branches in the axil of a leaf or of a subulate .2 in. long linear abortive leaf between the leaves on the upper part of the branches; branches .5 in. long, slender, divaricate; bracteoles minute, linear; flowers 2 to 5 in each raceme, buds ovoid. *Calyx-lobes* 5, rounded, .05 in. long, ciliate. *Corolla-lobes* 5, white, ovate, acute or obtuse, .15 in. long, gland-dotted. *Stamens* as long as corolla-lobes; filaments very short; anthers broadly oblong, mucronate. *Ovary* rounded, gradually produced in an erect or curved style, .1 in. long. *Berry* pyriform or nearly globose, .2 in. in diam., smooth, slightly ribbed when dry.

PERAK: on Ulu Batang Padang at 4,900 feet, *Wray* 1513; *Scortechini*.

45. *ARDISIA ODONTOPHYLLA*, Wall. Cat. 2279 (1829) (*not of* Lindl.); A. DC. Trans. Linn. Soc. XVII. 125, t. VI., Prod. VIII. 135; Clarke in Hook. f. Fl. Br. Ind. III. 525; Mez Monog. Myrs. 150. *A. pavonina*, Herb. Hamilt. *vide* DC. in Prod. l.c.—DISTRIB. India (Assam and Cachar).

VAR. *Lobbii*, Clarke in Hook. f. Fl. Br. Ind. III. 526. An almost herbaceous undershrub reaching to about 2 feet in height, the stems rooting from nodes near the base; bark fleshy, pale brown; pith large; upper part of stem densely fulvous-villous; leaf-buds small, short. *Leaves* membranous, sub-opposite; elliptic or elliptic-oblong or obovate-lanceolate, acute at apex, cuneate at base and sometimes slightly rounded; the margins sharply serrate except for a short distance near the base; glabrous above except on the hirsute midrib, rusty-tomentose beneath, the midrib and main-nerves usually ferruginous-

villous on the lower surface; glands scattered, not prominent; 4 to 8 in. long, 1·5 to 3·5 in. broad; midrib thick, prominent; main-nerves 8 to 12 pairs, prominent, irregular in distance and angle, curving upwards to and along the margin; secondary nerves few, reticulations transverse; petiole variable, stout, ·4 to 1 in. long, ferruginous-villous, rarely glabrescent. *Inflorescence* of short (under 1 in. long) lax, few-flowered, pubescent, simple or compound, umbellate racemes, from the axils of leaves below the summit or of a linear subulate abortive leaf about ·5 in. long; peduncles slender, ·5 to 2 in. long; pedicels slender, ·3 to ·7 in. long, recurved; bracteoles short, subulate; buds ovoid. *Calyx-lobes* ovate, obtuse, ciliate, ·1 in. long, slightly pubescent, marked with faint brown striæ; tube short. *Corolla-lobes* pink, ovate, obtuse or bluntly acuminate, ·15 to ·2 in. long, unequal, marked with many light brown linear and round glands; tube short. *Stamens* half the length of the petals; anthers broad, oblong, ·1 in. thick, emarginate; filaments very stout. *Ovary* ovoid, gradually narrowed into a slender subulate style ·1 in. long, the top of the ovary and base of the style short pubescent. *Berry* globose, scarlet, fleshy, ·25 in. in diam., smooth.

PERAK: *Wray* 2285, 2975; *King's Collector* 2583, 2978, 3053, 7367. SELANGOR: *Ridley* 7560. PAHANG: *Ridley* 2270, 5825. SINGAPORE: *Lobb* 316, an undershrub of dense forests in wet localities.

*Ridley's* Pahang specimens have smaller leaves and longer calyx-lobes, with fewer-flowered inflorescences, the whole plant more thickly fulvous-villous, but do not seem capable of separation.

46. *ARDISIA BAMBUSETORUM*, King & Gamble, n. sp. A small semi-herbaceous shrub 1 to 2 feet high; stem pale brown about ·25 in. in diam., bark spongy, pith large. *Leaves* membranous; oblong or oblong-lanceolate or obovate-oblong, acute at apex, narrowly attenuate at base and slightly rounded; glabrous on both surfaces, slightly scaly only beneath; glands few, scattered, chiefly near the margin; margins very briefly and irregularly toothed, usually recurved; 4 to 6 in. long, 1 to 1·5 in. broad; midrib slender; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curved upwards, and often branching, to and along the margin, where they anastomose in a rough intramarginal nerve; secondary nerves few, reticulations oblique; petiole ·4 to ·6 in. long, channelled above. *Inflorescence* of lateral pedunculate racemes 1 to 1·5 in. long supported by a linear abortive leaf ·5 in. long; peduncle ·7 to ·8 in. long, raceme the same; bracteoles small subulate about ·1 in. long; pedicels slender, clavate, ·4 to ·5 in. long recurved; buds ovoid; flowers white.

*Calyx-lobes* 5, linear-oblong, acute, reflexed, .05 to .07 in. long, not gland-dotted. *Corolla-lobes* ovate-oblong, .15 in. long, dotted with elongated brown glands. *Stamens* shorter than the corolla-lobes; filaments short; anthers oblong, obtuse, emarginate, .1 in. long. *Ovary* rounded, glabrous; style slender, curved, .1 in. long. *Fruit* not seen.

PERAK: in dense bamboo forest, *King's Collector* 10095.

This is scarcely more than a var. of *A. odontophylla*, but is recognised by the somewhat different leaves, white flowers, glabrous ovary and style, and the absence of fulvous tomentum.

## 6. ANTISTROPHE, A. DC.

Slender shrubs, with puberulous branchlets. *Leaves* alternate, entire or dentate, lanceolate, acuminate, glandular, petiole margined. *Flowers* hermaphrodite, in sub-sessile axillary umbels or solitary, pedicels slender, bracts small. *Calyx* small, 5-lobed, persistent; lobes acute, imbricate. *Corolla* deeply 5-cleft; lobes lanceolate acuminate, overlapping to the left in bud. *Stamens* 5, inserted on the throat of the corolla; filaments short; anthers free, hastate-lanceolate, the connective produced upwards in a membranous tip, cells dehiscing longitudinally and introrsely. *Ovary* ovoid, attenuated in a filiform style, stigma punctiform; ovules many on a globose central placenta. *Fruit* a globose berry, pericarp coriaceous, endocarp chartaceous. *Seed* 1, albumen ruminated; embryo cylindric, transverse.—**DISTRIB.** Species 4, Indian and Malayan.

Inflorescence 1-2-flowered, glabrous; leaves caudate acuminate	..	1. <i>A. caudata</i> .
Inflorescence 4-6-flowered, hirsute; leaves short acuminate	..	2. <i>A. Curtisii</i> .

1. **ANTISTROPHE CAUDATA**, King & Gamble, n. sp. A shrub or small tree; branches smooth, divaricate, nearly glabrous; branchlets puberulous, with faint raised lines from the bases of the leaf-petioles; innovations rusty-pubescent. *Leaves* membranous; elliptic-lanceolate, caudate-acuminate at apex, attenuate or somewhat rounded at base; entire or undulate on the margins; glabrous on the upper, minutely puberulous or glabrous and with pale peltate scales on the lower, surface; glandular dots very many, scattered, prominent; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, conspicuous below; main-nerves 8 to 12 pairs, prominent beneath, at an angle of about 60° with the midrib, arching upwards, forking and obscurely anastomosing near the margin, the lowest pair of nerves more oblique than the rest; secondary nerves short, slender, reticulations indistinct; petiole .1 to .2 in. long, edged by the decurrent margins of the blade which are almost connivent above. *Inflorescence* of short, axillary, usually only 1-2-flowered sub-



sessile umbels, with very minute bracts; pedicels slender, clavate, .4 in. long; buds conical, long acuminate, .3 in. long, glabrous. *Calyx-lobes* ovate, acute, .05 in. long, ciliate on the edges, gland-dotted in two central lines. *Corolla-lobes* ovate, long-caudate-acuminate, .3 in. long, glabrous, dotted with few elongate glands. *Stamens* inserted at the base of the corolla-lobes and nearly as long as them (.25 in.); anthers sagittate-lanceolate with prominent rows of glands on the back, connective produced upwards in a membranous tip. *Ovary* ovoid, glabrous; style subulate, .25 in. long, very slender. *Berry* globose, .25 in. in diam., smooth, obscurely vertically striate.

PERAK: at Gunong Batu Pateh, 3,400 feet, *Wray* 456, 978, 3242; *Curtis* 3324.

This species at first sight resembles *A. oxyantha*, A. DC., of North-East India, but has smaller and differently-veined leaves, with different glands and smaller flowers.

2. *ANTISTROPHE CURTISII*, King & Gamble, n. sp. A shrub (?); branchlets round, rusty-glandular-hirsute, zigzag, with faint raised lines from the bases of the petioles of the leaves; innovations densely rusty-glandular-hirsute. *Leaves* membranous; elliptic or elliptic-oblong, acuminate at apex, rounded at base, entire; nearly glabrous above except on the midrib, sparsely rusty-hirsute beneath; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath; main-nerves about 10 pairs, at about an angle of 50° with the midrib, curved upwards, forked and broadly anastomosing near the margin, lowest pair not more oblique than the others; secondary nerves and reticulations obscure; petiole .2 in. long, crispedly channelled above. *Inflorescence* of densely rusty-hirsute, sub-sessile, axillary, 4-6-flowered, umbellate racemes, .1 to .15 in. long; bracteoles subulate, .05 in. long; pedicels slender, .3 to .5 in. long; buds caudate-acuminate, .3 in. long. *Calyx-lobes* linear subulate, .1 in. long, densely rusty-hirsute. *Corolla-lobes* ovate at base, long caudate-acuminate, .3 in. long, scarcely dotted, 3-5-nerved, sparsely hirsute without. *Stamens* rather shorter than the corolla-lobes, connivent in a cone; anthers sessile, lanceolate sagittate, the back with 2 rows of prominent round or elongate glands, the connective produced in a blunt membranous tip. *Ovary* ovoid, style slender, as long as anthers. *Berry* not seen.

PERAK: in Kuran Valley, below the gap, 4,000 feet, *Curtis* 3390.

## 7. *ÆGICERAS*, Gaertn.

Sea-coast shrubs, or small trees; branches cylindric, glabrous. *Leaves* scattered, petioled, entire, glabrous, alternate. *Flowers* large

(for the Order) white, pedicellate, without bracteoles, in terminal or axillary umbels or panicles, pedicels slender. *Calyx* 5-lobed; lobes obtuse, coriaceous, twisted to the left, overlapping to the right; tube none. *Corolla* with short tube; lobes 5, acute, overlapping to the right in bud, afterwards recurved. *Stamens* 5, inserted on the corolla-tube; filaments elongate, connate into a tube below; anthers with transversely septate cells, cordate-lanceolate, introrse, dehiscent longitudinally. *Ovary* fusiform, narrowed into an elongated style; stigma acute; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, acute, coriaceous, 1-seeded; pericarp coriaceous, afterwards splitting, testa membranous. *Seed* elongate, exalbuminous; radicle inferior, enlarged at the base, joined with the cotyledons into a cylindric tube; germination often taking place while still on the plant, as in some *Rhizophorea*.—DISTRIB. Two species, of the sea-coasts of India, Burma, the Malay Peninsula and Islands, to South China and tropical Australia.

*ÆGICERAS MAJUS*, Gaertn. Fruct. I. 216, t. 46, fig. 1 (1788). A shrub or small tree reaching 15 to 20 feet in height, evergreen, all parts glabrous; branches greyish-black, smooth; branchlets reddish. *Leaves* coriaceous; obovate, rounded obtuse or emarginate at apex sometimes even obcordate, cuneate at base, margins recurved; glandular dots many, inconspicuous; 1.5 to 3.5 in. long, 1 to 1.5 in. broad; midrib slender, raised above or sometimes depressed; main-nerves about 10 pairs, slender, raised above, straight at first then curving upwards; secondary nerves slender, few, reticulations not prominent; petiole .2 to .3 in. long, thick, bordered by the decurrent margins of the blade. *Inflorescence* a terminal, axillary or leaf-opposed many- (15 to 20) flowered umbel, sessile or very short peduncled; bracts oblong-lanceolate, deciduous; pedicels slender, .3 to .5 in. long; buds conical. *Calyx-lobes* concave, gibbous at the base, broadest at top, .25 in. long, .15 in. broad, with parallel veins and scattered black dots in the lower part. *Corolla-lobes* ovate, acuminate, glabrous, parallel-veined, .25 in. long, recurved; tube as long as lobes, villous hairy within. *Stamens* longer than corolla-lobes, exsert; filaments connate half-way up, linear, connate part densely villous, free part glabrous .2 in. long; anthers .1 to .15 in. long, dorsifixed, cells prominently septate. *Ovary* ovoid, surmounted by a subulate angular style, .3 in. long, black-gland-dotted below. *Fruit* a long acuminate pale brown capsule, up to 3 in. long, .25 in. in diam., glabrous. *Seed* 1, elongate, filling the capsule, embryo inverse, funicle very long. Willd. Sp. Pl. I. 1185; Roem. & Schult. Syst. Veg. IV. 511; Roxb. Fl. Ind. III. 130; A. DC. in Ann. Sc. Nat. 2, XVI. t. 9A, and Prod. VIII.

142; Wight Icon. t. 146; Miq. Fl. Ind. Bat. II. 1031; Scheff. Myrs. 97; Benth. Fl. Austral. IV. 277; Dalz. & Gibs. Bomb. Fl. 137; Bedd. Fl. Sylv. CXXXIX. Anal. pl. XIX. III.; Clarke in Hook. f. Fl. Br. Ind. III. 533; Trimen Fl. Ceyl. III. 74; Cooke Fl. Bomb. II. 88; Koord. & Val. Bijdr. V. 276; Pax in Engl. & Prantl Pflanzenfam. IV. i. 97, fig. 57; Schimp. Strandfl. 44, figs. 1, 2; Prain Beng. Pl. 645. *Æ. fragrans*, Koenig Ann. of Bot. I. 129, t. 3; Wall. Cat. 2326; Wight in Hook. Bot. Misc. III. 84, t. 21. *Æ. minus*, A. DC. l.c. 142. *Æ. Malaspinæa*, DC. l.c. 143. *Æ. obovatum*, Blume Bijdr. 693. *Æ. corniculatum*, Blanco Fl. Filip. 79; Kurz in Journ. As. Soc. Beng. XLVI. II. 227 and For. Fl. III. 114; Mez Monog. Myrs. 55, fig. 8. *Rhizophora corniculata*, Linn. Sp. Pl. Ed. 3 (1764), 635. "*Pou-Kandel*," Rheede Hort. Mal. VI. 36. *Mangium fruticosum corniculatum*, Rumph. Herb. Amb. III. 117.

PENANG: Wallich 2326; Curtis 52, 513. PERAK: King's Collector 4961. MALACCA: Maingay (K.D.) 1017; Griffith (K.D.) 3538. SINGAPORE: Ridley 2801A, 3632A.—DISTRIB. Sea-coast of India from Sind to Ceylon, the Sundarbans, Burma, and the Andaman Islands; eastwards to the Malay Islands, South China, the Philippines and Australia. One of the coast plants included under the general name of "Mangroves."

#### Order LXXI. SAPOTACEÆ.

Trees or shrubs, with milky juice, generally evergreen, young parts often rusty-tomentose. *Leaves* alternate, rarely sub-opposite, coriaceous or rarely membranous, entire, penniveined; stipules none or very caducous. *Flowers* usually hermaphrodite, small or medium-sized, solitary or fascicled in the axils of the leaves, sometimes (*Sarcosperma*) paniculate; bracts and bracteoles very small or wanting. *Calyx* inferior, persistent or deciduous; lobes 4 to 8, much imbricate, occasionally biseriate with the outer ones valvate. *Corolla* gamopetalous; tube short, campanulate or urceolate; lobes as many as, or 2 to 4 times as many as, those of the calyx. *Stamens* inserted on the corolla-tube in 1 to 2 series and opposite to them, sometimes alternating with staminodes; filaments short, erect; anthers ovate-lanceolate or linear-sagittate, 2-celled, the connective sometimes produced. *Disk* hypogynous, often inconspicuous or wanting. *Ovary* superior, sessile, often villous, 2-5- or more celled; style shortly conical or elongate-subulate, glabrous; stigma terminal, punctiform; ovules solitary in the cells, attached to the inner angle. *Fruit* an indehiscent, 1-8-seeded berry, pericarp usually fleshy. *Seeds*, if solitary, conform to

the fruit; if more than one compressed, ellipsoid; hilum conspicuous; testa usually crustaceous, shining; embryo straight, exalbuminous with fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—**DISTRIB.** About 320 species, in the tropical regions of the whole world, genera about 24.

Calyx-lobes 1-seriate, imbricate; stamens 5 to 6:—

Staminodes none .. .. . 1. *CHRYSOPHYLLUM*.

Staminodes present:—

Flowers sessile or in panicles .. .. . 2. *SARCOSPERMA*.

Flowers in axillary fascicles .. .. . 3. *SIDEROXYLON*.

Calyx-lobes 2-seriate, outer series valvate:—

Calyx segments 4:—

Seeds albuminous:—

Stamens 8 .. .. . 4. *ISONANDRA*.

Stamens 12 or more .. .. . 5. *PAYENA*.

Seeds exalbuminous, stamens 12 or more .. .. . 6. *BASSIA*.

Calyx segments 6 to 8:—

Staminodes none, seeds exalbuminous .. .. . 7. *PALAQIUM*.

Staminodes present, seeds albuminous .. .. . 8. *MIMUSOPS*.

### 1. *CHRYSOPHYLLUM*, Linn.

Trees with milky juice. *Leaves* coriaceous, glabrous or pubescent on the under-surface, main-nerves usually very many, thin; stipules none. *Flowers* small, in axillary fascicles, usually hermaphrodite. *Calyx* 5–7-lobed; lobes subequal, imbricate. *Corolla* tubular-campanulate or sub-rotate, 5–7-lobed; lobes imbricate, entire. *Stamens* equal in number with, and opposite to, the corolla-lobes, attached to the tube or the base of the lobes; filaments subulate or filiform; anthers ovate or triangular, extrorse or laterally dehiscent; staminodes none. *Ovary* villous, 5-, rarely 6–7-celled, style glabrous; ovules one in each cell, attached to the central placenta. *Fruit* a fleshy or coriaceous berry, globose, 5-celled or less by abortion. *Seeds* large; testa very hard, dull or shining; hilum conspicuous; embryo as large as the seed, erect, cotyledons flat in fleshy albumen, radicle inferior.—**DISTRIB.** About 60 species, chiefly tropical American, a few only in Asia, Africa and Australia.

*CHRYSOPHYLLUM* ROXBURGHII, G. Don Gen. Syst. IV. 33 (1837). A slender, erect tree reaching 40 to 60 ft. in height, evergreen; branches horizontal; bark smooth, grey; young branchlets and innovations ferruginous-pubescent. *Leaves* coriaceous, glabrous, alternate; oblong-lanceolate, suddenly caudate-acuminate at the apex which is sometimes obtuse, cuneate at base and unequal, undulate on the margins; 3 to 6 in. long, 1.25–2 in. broad; midrib slender, prominent

beneath; main-nerves very numerous, parallel, nearly at right angles to midrib, meeting in an intramarginal nerve; secondary nerves similar, reticulations slanting; petiole thick, .25 in. long, pubescent. *Flowers* small, in rounded axillary fascicles; pedicels slender, .1 to .2 in. long, ferruginous-pubescent. *Calyx-lobes* 5, ovate, glabrous or pubescent outside, thick, ciliate on the margins, .07 to .1 in. long; tube short. *Corolla* tubular-campanulate, .1 in. long; lobes 5, short, ciliate on the margins. *Stamens* 5, shorter than the corolla, opposite the corolla-lobes and inserted on the base of the tube; filaments slender; anthers ovate, apiculate and ending in a minute tuft of hairs, extrorse, slits somewhat lateral. *Ovary* rounded, obscurely 5-lobed, surrounded by a thick tuft of long ferruginous hairs; style thick, cylindro-conical, glabrous; cells 5. *Fruit* a globose or obscurely 5-lobed berry 1 to 1.5 in. in diam., strongly 5-lobed when dry, ferruginous-tomentose when young afterwards smooth, yellowish-green, with thick glutinous pulp. *Seeds* .6 in. long, .5 in. broad, flattened, the outer edge curved, the inner nearly straight; hilum oblong, conspicuous, pale; testa very hard, thick, shining, chestnut-brown; embryo erect, cotyledons flat, .4 in. broad, ovate, obtuse, 3-nerved; radicle large, cylindric. A. DC. Prod. VIII. 162; Clarke in Hook. f. Fl. Br. Ind. III. 535; Bedd. Fl. Sylv. t. 236; Kurz For. Fl. II. 118 and in Journ. As. Soc. Beng. XLVI. ii. (1877) 228; Trimen Fl. Ceyl. III. 76; Dalz. & Gibs. Bomb. Fl. 138; Cooke Bomb. Fl. II. 88; Burck Ann. Gard. Buit. V. i. (1886), 4; Koord. & Val. Bijdr. I. 130. *C. acuminatum*, Roxb. Fl. Ind. I. 599; Wall. Cat. 4160 (not of Lamk.). *C. lanceolatum*, A. DC. l.c.; Miq. Fl. Ind. Bat. II. 1035. *C. javanicum*, Steud. Nom. Ed. II. i. 359. *Nycteristition lanceolatum*, Bl. Bijdr. 676.

MALACCA: Griffith (K.D.) 3600; Maingay (K.D.) 980; Goodenough 1739. SINGAPORE: Ridley 2756, 5837.—DISTRIB. British India; Burma; Java; Sumatra.

*Curtis* No. 1072, collected at Batu Ferengy, Penang, and now in the Kew Herbarium, seems to be a new species of *Chrysophyllum*. The leaves are chartaceous, lanceolate, acuminate at both ends, glabrous, shining, 2 to 4 in. long, .75 to 1 in. broad, the veins indistinct. *Flowers* unknown. *Fruit* a fleshy berry, .5 in. in diam., 5-lobed when dry, glabrous. *Seeds* .4 in. long, .25 in. broad, rounded on the outside, narrowed and somewhat concave within; testa hard, dark chestnut-brown, shining; hilum narrow. It might be called *C. Curtisii*, n. sp., King & Gamble.

## 2. SARCOSPERMA, Hook. f.

Glabrous trees. *Leaves* coriaceous or chartaceous, opposite and alternate, oblong; stipules caducous. *Flowers* small, sessile or fascicled

on the branches of a simple or compound panicle, sessile or shortly pedicellate; bracteoles minute. *Calyx-lobes* 5, rounded, sub-equal, much imbricate. *Corolla* broadly campanulate; tube short; lobes 5, rounded, entire, much imbricate. *Stamens* 5, inserted on the tube of the corolla and opposite to its lobes; filaments very short; anthers obtuse, laterally or extrorsely dehiscent. *Staminodes* 5, small, subulate or rounded. *Ovary* glabrous, 1-2-celled; style short; stigma somewhat lobed, capitate. *Fruit* an ellipsoid berry, 1-2-seeded; pericarp coriaceous, scarcely thick. *Seeds* 1-2; testa crustaceous; hilum nearly basal; albumen none; embryo fleshy.—**DISTRIB.** Species 3, in North-East India, Burma, Malaya and S. China.

**SARCOSPERMA PANICULATUM**, Stapf & King in Hook. f. Ic. Plant. t. 2690 (1901). A tree, reaching 50 to 70 feet in height and 18 to 20 in. in diam.; branchlets thick, dark brown, glabrous. *Leaves* chartaceous; sub-opposite, elliptic-oblong, bluntly acuminate at apex, acute or rounded or often rhomboid at base; glabrous on both surfaces, nearly black when dry; 4 to 8·5 in. long, 1·5 to 3 in. broad; midrib slender; main-nerves 7-8 pairs, slender, distant, often nearly 1 in. apart, starting at an angle of about 60° with the midrib and at once curving upwards to and along the margin; secondary nerves many and, like the transverse reticulations, inconspicuous; glandular pits in the axils of most of the main-nerves; petiole ·5 to ·7 in. long, channelled above and with two minute rounded auricles below the blade. *Flowers* solitary or clustered on the branches of a leafy compound panicle of racemes, the racemes often 2 in. long; bracteoles minute, triangular; pedicels rarely reaching ·05 in. in length, stout; buds globose. *Calyx-lobes* 5, imbricate, rounded, usually 3 larger with somewhat scarious margins, 2 smaller thicker and slightly acute, shortly campanulate. *Corolla-lobes* 5, closely imbricate, rounded, glabrous, ·05 in. long, the margins revolute; tube as long as lobes. *Stamens* 5, inserted on the top of the tube; filaments very short; anthers ovate, rounded, introrse, or laterally dehiscent. *Staminodes* alternating with the stamens, minute, nearly orbicular, crenulate. *Ovary* conical, furrowed; style very short, thick, stigma capitate, minutely 2-4-lobed. *Fruit* drupaceous, ellipsoid, seeds, 1-2. *Bracca paniculata*, King in Journ. As. Soc. Beng. LXIV. ii. 101.

**PERAK:** *Scortechini*; *King's Collector* 7970, 8086, 10284, 10554, 10672, 10835; among large bamboos, on river-banks, or in mixed forest.

### 3. SIDEROXYLON, Linn.

Trees or shrubs, sometimes armed, with milky juice. *Leaves* coriaceous or thinner, entire, alternate; stipules none. *Flowers*

small, in fascicles in the axils of the leaves or of the scars of fallen leaves, sub-sessile or shortly pedicelled. *Calyx* of 5-6 imbricate, usually orbicular and obtuse segments. *Corolla* campanulate, or tubular-campanulate, with 5 or rarely 6 lobes, the lobes imbricate. *Stamens* as many as the corolla-lobes and opposite to them, attached to the tube or at its base; filaments linear, usually short; anthers ovate or lanceolate; staminodes alternating with the stamens, lanceolate. *Ovary* usually villous, with 5 or fewer cells; style cylindric; stigma small; ovules erect, placentas axile. *Fruit* an ovoid or globose fleshy berry, 5- or less-seeded, usually with one seed only. *Seeds* compressed, generally solitary; testa hard, crustaceous, usually shining; hilum oblong or linear; embryo erect, cotyledons flat or thickened, in fleshy albumen; radicle short, inferior.—**DISTRIB.** About 60 species, mostly of tropical regions in both hemispheres, a few only extratropical in South Africa or Australasia.

Leaves more than 3 in. broad, yellowish when dry, main-nerves very prominent .. .. . 1. *S. malaccense*.

Leaves under 3 in. broad, green or brown when dry:—

Leaves nearly glabrous, membranous, obovate-acuminate .. 2. *S. Maingayi*.

Leaves pubescent beneath, at least on the nerves:—

Corolla-tube longer than the lobes; leaves elliptic, grey-silky beneath .. .. . 3. *S. Derryanum*.

Corolla-tube shorter than the lobes:—

Leaves obovate, main-nerves not very prominent or regular .. .. . 4. *S. ferrugineum*.

Leaves oblong-lanceolate, main-nerves very prominent and regular .. .. . 5. *S. firmum*.

SPECIES IMPERFECTLY KNOWN: 6. *S. Wallichianum*.

1. **SIDEROXYLON MALACCENSE**, Clarke in Hook. f. Fl. Br. Ind. III. 537 (1882). A large tree, reaching 40 to 60 feet in height; branches pale brown; ultimate branchlets ferruginous-pubescent, as are the leaf-buds and young leaves. *Leaves* coriaceous; often, not always, crowded towards the ends of the branchlets; obovate-oblong, rounded or shortly acute at apex, somewhat cuneate at base; deep-green above, pale bluish-green beneath, yellow when dry, densely rusty-pubescent beneath when young, glabrous on both surfaces when old except for rusty hairs on the midrib and main-nerves beneath; 6 to 8 in. long, 3 to 4·5 in. broad; midrib very thick and prominent; main-nerves 8-14 pairs, very prominent, starting at about an angle of 60° with the midrib, parallel at first, ultimately arched upwards; reticulations not prominent, obliquely joining the main-nerves; petiole 1 to 1·5 in. long, thick, enlarged at base, bordered above by the slightly decurrent margins of the blade. *Flowers* fasciculate, shortly pedicelled, in the axils of the leaves, above

the scars of fallen leaves or on the year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, rusty-tomentose. *Calyx-lobes* 5, imbricate, .15 to .2 in. long, densely rusty-pubescent without, rounded. *Corolla* tubular-campanulate, .15 in. long, absent in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* attached to the base of the corolla-tube; anthers ovate, apiculate, opening by side-slits; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top, obscurely 5-lobed, 5-celled; style cylindric. *Berry* fleshy, somewhat oblong, rounded, tipped with the persistent style, thickly covered with velvety orange-red tomentum and about .5 in. in diam. *Seeds* not accurately known.

PENANG: *Curtis* 1452. PERAK: *Wray* 136; *King's Collector* 6550. MALACCA: *Maingay* (K.D.) 994; *Holmberg* 704. SINGAPORE: *Ridley* 6130, 6499; *Cantley* 89.

Mr. Cantley says that this tree gives the true "Daru-daru" or "Dedâru" wood of the Malay Peninsula.

2. *SIDEROXYLON MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 536 (1882). A tree with rusty-pubescent branchlets and young shoots. *Leaves* membranous; crowded towards the ends of the branchlets; obovate, shortly acuminate at apex, cuneate at base; rusty-pubescent when young, glabrous when old or rusty-pubescent on the midrib and main-nerves; 4 to 8 in. long, 1.5 to 3 in. broad; midrib prominent; main-nerves 8 to 11 pairs, starting at an angle of nearly 60° to the midrib, at first parallel then arching upwards to near the margin; transverse reticulations more or less parallel; petiole 1 to 1.5 in. long, bordered by the decurrent margins of the blade. *Flowers* fasciculate, sessile or with very short pedicels, chiefly on the previous year's wood below the leaves and shoots of the year. *Calyx-lobes* 5, imbricate, rounded, rusty-pubescent without, .075 to .1 in. in diam. *Corolla* tubular-campanulate, as long as or rather shorter than the calyx, wanting in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* short; filaments slender; anthers ovate; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top; style cylindric. *Berry* fleshy, 1.5 in. in diam., ovoid or globular, full of guttapercha. *Seeds* 4, compressed, .7 in. long by .3 to .35 in. broad; rounded outside, nearly straight within, the long narrow oblong hilum covering nearly the whole margin; testa hard, shining, dark chestnut-brown; albumen firm, white; cotyledons plane, appressed, elliptic; radicle inferior.

NEGRI SEMBILAN: *Ridley* 10084. MALACCA: *Maingay* (K.D.) 993; *Hervey*. SINGAPORE: *Ridley* 8928, 9223.

The fruit description is chiefly taken from Maingay's notes in the Kew Herbarium.



3. *SIDEROXYLON DERRYANUM*, King & Gamble, n. sp. A tree; branchlets grey, uppermost appressed-pubescent; innovations with nearly black hairs. *Leaves* chartaceous; elliptic, very abruptly short-acuminate at apex, broadly cuneate at base; margins more or less recurved; glabrous above, densely silvery-pubescent beneath; 3 to 5·5 in. long, 1·5 to 3 in. broad; midrib prominent, impressed above; main-nerves 12 to 18 pairs, parallel, starting at an angle of about 75° with the midrib, meeting near the margin in a faint intramarginal looped nerve; secondary nerves similar, rather prominent, reticulations few, obscure; petiole ·3 to ·5 in. long, channelled above, pubescent with nearly black hairs. *Flowers* fascicled, about 5 together in the axils of the leaves or of the scars of fallen leaves; pedicels ·25 in. long, tawny-pubescent; buds oblong, conical. *Calyx-lobes* 5, rounded, obtuse, the 2 outer thick very pubescent, the 3 inner somewhat scarious, pubescent only on the middle of the back. *Corolla* campanulate, ·2 in. long; tube ·15 in. long, glabrous within, with a few sparse hairs without; lobes 5, ovate, imbricate, margins recurved. *Stamens* 5, short, inserted at the top of the tube; filaments conical; anthers ovate-cordate, dehiscing by side-slits; staminodes subulate, glabrous. *Ovary* villous, obscurely 5-lobed, 5-celled; style very short; stigma obscurely 5-lobed. *Berry* oblong, dark blue, glabrous, the top flat and crowned with the remains of the style, ·6–7 in. long, 1-seeded. *Seed* oblong, ·6 in. long by ·3 in. in diam. truncate obliquely at the base; testa thick, light-brown, striate; hilum rather small, sub-basal; albumen thin; cotyledons thick; radicle small.

PERAK: *Derry-Curtis* 3641.

The colour of the silvery under-surface of the leaves is difficult to describe—it is sometimes dark and smoky-looking.

4. *SIDEROXYLON FERRUGINEUM*, Hook. & Arn. Bot. Beech. Voy. 266, t. 55 (1841). A small tree; branches rough, ultimate branchlets ferruginous-pubescent like the leaf-buds and young leaves, branchlets with a raised line downwards from each leaf or scar of a fallen leaf. *Leaves* coriaceous; obovate or oblong-lanceolate, rounded or bluntly acute at apex, attenuate at base; shining above, densely appressed ferruginous-silky beneath when young, ultimately nearly glabrous; 2·5 to 6 in. long, 1 to 3 in. broad; midrib prominent; main-nerves 10 to 12 pairs, fairly prominent, especially above, starting at about an angle of 60° with the midrib, at first nearly parallel then arching upwards to meet near the margin; secondary nerves similar, reticulations oblique; petiole ·5 to ·7 in. long, the edges bordered by the decurrent margins of the blade, enlarged at base. *Flowers* fasciculate, shortly pedicelled, in the axils of

the leaves or above the scars of fallen leaves on year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, covered like the obtuse buds with rusty tomentum. *Calyx-lobes* round, .025 to .075 in. in diam., with scarious margins, closely imbricate, rusty-pubescent outside. *Corolla* campanulate, .1 in. long; tube short; lobes 5, imbricate, rounded, crenulate, sparingly pubescent near the base within, in ♀ flowers wanting or deciduous. *Stamens* very short, attached to the corolla-tube above the base; filaments linear; anthers rounded, opening by marginal slits; staminodes subulate or somewhat hastate, acuminate. *Ovary* depressed, obscurely 5-lobed, pubescent; stigma short, cylindric, with 5 minute punctiform styles. *Berry* ovoid, shining .35 by .3 in., 1-2-seeded. *Seeds* ovoid, .25 by .15 in.; testa shining, dark brown, thick; hilum large, oblong; albumen thick; cotyledons flat. A. DC. Prod. VIII. 178; Clarke in Hook. fil. Fl. Br. Ind. III. 537. *S. attenuatum*, A. DC. l.c.; Wight Ic. t. 1590; Kurz For. Fl. II. 117, and in Journ. As. Soc. Beng. XLVI. ii. (1877) 229. *Mimusops ? attenuata*, Wall. Cat. 4150.

KEDAH: Langkawi, Curtis. PENANG: Curtis 273, 703, 704. PERAK: Scortechini 1463; King's Collector 1224. MALACCA: Maingay (K.D.) 982; Griffith (K.D.) 3604; Goodenough 1735. SINGAPORE: Wallich 4150; Lobb 319; Ridley 5643, 5908. A sea-shore tree, found also by Ridley on Tiuman Island and at Kwala Pahang (Trans. Linn. Soc. Ser. 2. III. 317).—DISTRIB. Burma, Andaman Islands, Nicobar Islands, Malay Archipelago to the Philippines and S. China.

5. *SIDEROXYLON FIRMUM*, Pierre; Burck in Ann. Jard. Buit. V. 17, tab. III. (1885). A small tree; branchlets thick, striate, brown; innovations ferruginous-pubescent. *Leaves* coriaceous; oblong-lanceolate, shortly acuminate at apex, narrowly acute at base; glabrous above, rusty-pubescent on the nerves beneath and on young leaves; margins recurved; 4 to 5 in. long, 1 to 1.5 in. broad; midrib strong, prominent, impressed above; main-nerves 12 to 16 pairs, very prominent, about .2 to .3 in. apart, starting at an angle of about 40° with the midrib, parallel, curved near and along the margin; reticulations transverse, very regular and prominent; petiole 1 to 1.5 in. long, channelled above and bordered by the decurrent margins of the blade, rusty-pubescent. *Flowers* fascicled, 4 to 6 together in the axils of the leaves; pedicels variable, .3 to .6 in. long, rusty-pubescent, slender in flower, thickened in fruit. *Calyx-lobes* 5, rounded, imbricate, .15 in. long, densely rusty-pubescent, 3 outer thick, 2 inner more or less scarious on the margins. *Corolla* campanulate, .15 in. long, 5-lobed, glabrous within, slightly hairy without; tube rather short; lobes oblong, rounded. *Stamens* inserted on the top of the tube; filaments glabrous; anthers ovate-apiculate;

staminodes subulate, about .05 in. long. *Ovary* villous; style clavate, glabrous. *Fruit* an oblong or somewhat obovoid berry, depressed at apex, glabrous, fleshy, supported by the somewhat enlarged persistent calyx-lobes, seed usually 1. *Seed* oblong, obtuse above, somewhat pointed below, little compressed, .6 in. long, .25 in. broad and thick; testa chestnut-brown, shining, crustaceous; hilum linear, flat, occupying nearly the whole inner face of the seed; albumen thick; cotyledons leafy, flat, oblong, 3-nerved; radicle inferior, pointed. *Chrysophyllum firmum*, Miq. Fl. Ind. Bat. Suppl. 579.

PENANG: at West Hill, *Curtis*, 1575.—DISTRIB. *Bangka*, *Teysmann*; *Philippines*.

The *Bangka* specimens have the leaves up to 2.5 in. broad, but in other respects we find no difference from *Teysmann's* type in the *Penang* plant.

#### SPECIES IMPERFECTLY KNOWN.

6. *SIDEROXYLON WALLICHIANUM*, G. Don Gen. Syst. IV. 28 (1837). A tree (?); branchlets pale brown, ferruginous-villous as are the innovations. *Leaves* chartaceous; elliptic-obovate, obliquely acuminate at apex, cuneate at base, crowded towards the ends of the branchlets; 6 to 8 in. long, 3 to 4 in. broad; midrib thick; main-nerves 6 to 7 pairs, curved upwards, distant, reticulations prominent; petiole thick, densely tawny-pubescent. *Calyx-lobes* apparently 5, short, rounded, rusty-pubescent. Miq. Fl. Ind. Bat. II. 1037. *S.* (?) *rugosum*, Wall. Cat. 4158.

The only sheet of this is in the type Herbarium of Wallich's plants with the Linnean Society of London. The remains of flowers are very slight, but they seem to show that the plant belongs to this genus. The note "a small plant growing on crooks—flowers white—from the hills" attached to the sheet, seems to refer to some other plant, for the specimen itself has every appearance of having come from a tree.

#### 4. *ISONANDRA*, Wight.

Trees with milky juice. *Leaves* coriaceous, entire, alternate, penniveined, the main-nerves and midrib prominent, the rest usually rather obscure. *Flowers* small, in axillary shortly pedicellate clusters in the axils of present or fallen leaves. *Calyx* of 4 segments, the two outer opposite, more or less valvate; the two inner also opposite, imbricate. *Corolla* tubular, campanulate; lobes 4, much imbricate, somewhat twisted. *Stamens* 8, sub-equal, attached near the base of the corolla, both opposite to and alternate with the lobes; filaments short; anthers lanceolate, sagittate at base, extrorse; staminodes absent. *Ovary* 4-celled, villous; style linear. *Berry* somewhat small, ovoid or oblong with a fleshy pericarp. *Seed* usually 1 only, scarcely flattened; testa thick, shining, crustaceous; hilum

lateral, long; albumen fleshy, cotyledons flat, radicle inferior.—DISTRIB. About 7 species, 6 of which in South India and Ceylon.

1. *ISONANDRA PERAKENSIS*, King & Gamble, n. sp. A small tree reaching 30 to 40 feet in height; ultimate branchlets, leaf-buds and young leaves appressed greyish-brown-pubescent. *Leaves* coriaceous; obovate-oblong, rounded at the apex, cuneate sometimes unequally at the base; the margins reflexed, glabrous and dull above, thickly brown-pubescent beneath; 2 to 3·5 in. long, 1 to 1·5 in. broad; midrib prominent; main-nerves 8 to 10 pairs at about 60° with the midrib, reticulations very inconspicuous; petiole ·2 to ·3 in. long, rather stout. *Flowers* fasciculate, on very short, ·1 in. long, thick, angular pedicels in the axils of upper leaves; buds ·15 in. long, obtuse, brown-appressed-pubescent. *Calyx* of 4 lobes, an outer pair and an inner pair, the outer valvate, the inner shining within, minutely ciliate; lobes ·15 in. long. *Corolla* 4-lobed; lobes rounded, about equal to the tube, together about equal to the calyx. *Stamens* 8, filaments thickened; anthers lanceolate, sagittate at base, extrorse. *Ovary* slightly hairy, conical, surmounted by a short linear style as long as the calyx; cells 4. *Berry* oblong, acute, smooth, ·4 to ·5 in. long. *Seeds* ellipsoid, acute at apex, scarcely flattened, ·35 by ·15 in.; hilum large, oblong; testa dark brown, hard, smooth, shining; albumen fleshy; embryo large, cotyledons oblong.

PERAK: at 1,000 to 1,500 feet elevation, *King's Collector* 7138.

#### DOUBTFUL SPECIES.

2. *ISONANDRA RUFA*, King & Gamble, n. sp. A small tree, reaching 20 to 30 feet in height and 4 to 6 in. in diam.; younger branchlets and innovations densely ferruginous pubescent. *Leaves* membranous; obovate, long acuminate sometimes abruptly at apex, cuneate and finally more or less rounded at base; sparsely pubescent above when young, nearly glabrous when old; roughly pubescent beneath, especially on the nerves; 5 to 7 in. long, 1·5 to 2·5 in. broad; midrib prominent; main-nerves 8 to 10 pairs, irregularly distanced, at first at an angle of about 45° with the midrib, then arching upwards; secondary nerves and reticulations prominent; petiole ·3 in. long, slender, rusty-pubescent, channelled above; stipules very short, subulate, rusty-pubescent, very caducous. *Flowers* solitary or in pairs in the axils of the upper leaves or on the upper branchlets, very small; pedicels slender, ·25 in. long, recurved. *Calyx-lobes* 4, densely ferruginous-pubescent; 2 outer valvate, ovate, ·2 in. long; 2 inner imbricate, ovate, somewhat scarious and ciliate on the margins. *Corolla* tubular-campanulate; ·2 to ·25 in. long; tube slender, minutely

hairy without and near the mouth within; lobes 6 (?), linear oblong, .1 in. long, erect. *Stamens* 6 (?), .1 in. long; filaments very slender, villous; anthers ovate, penicillate-apiculate. *Ovary* rounded, glabrous; style slender, curved, .2 in. long. *Fruit* an oblong berry, about 1 in. long and .5 in. broad. *Seed* 1, testa thin, shining.

PERAK: *Scortechini* 159; *King's Collector* 4550, in dense jungle at 500 to 800 feet.

In only one flower were any traces found of the corolla and stamens, and there seemed to be 6 corolla-lobes instead of 4, and 6 stamens instead of 8. We consider it best, however, to leave the species here for the present and until better material is available.

### 5. PAYENA, A. DC.

Trees with milky juice. *Leaves* membranous or chartaceous, often silky beneath; stipules caducous. *Flowers* fascicled, rather few together, in the axils of the leaves on the upper part of the branchlets, pedicellate. *Calyx-lobes* 4, the 2 outer usually valvate enclosing the 2 inner generally imbricate. *Corolla* campanulate; tube broad, short; lobes 8, imbricate, in one or two series. *Stamens* 16, inserted on the corolla-tube; filaments short; anthers usually extrorse, ovate to linear, connective produced in an acumen; staminodes none. *Ovary* villous, usually 8-celled; style linear-subulate. *Fruit* an oblong or ovoid fleshy berry, few-seeded. *Seeds* oblong, usually somewhat compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen thin; cotyledons leafy, thin, flat, nearly as long and broad as the cavity of the seed; radicle inferior, generally rather conspicuous.—DISTRIB. About 6 to 7 species, found in the Malay Peninsula and Archipelago.

Flowers large, reaching .75 in. in length :—

- |                                                      |                                    |
|------------------------------------------------------|------------------------------------|
| Leaves 6 to 9 in. long, silky-pubescent beneath..    | .. 1. <i>P. Maingayi</i> .         |
| Leaves 4 to 5 in. long, glabrous on both surfaces .. | .. 2. <i>P. longipedicellata</i> . |

Flowers medium-sized or small, under .75 in. in length :—

Flowers in fascicles near the ends of the branchlets, having the appearance of a terminal inflorescence :—

- |                                                                    |                              |
|--------------------------------------------------------------------|------------------------------|
| Flowers moderate-sized, berry obpyriform, acuminate at tip .. .. . | .. 3. <i>P. Havilandii</i> . |
| Flowers small, berry oblong conical, truncate at tip ..            | .. 4. <i>P. Leerii</i> .     |

Flowers in fascicles in the axils of the leaves, never apparently terminal :—

- |                                                                            |                              |
|----------------------------------------------------------------------------|------------------------------|
| Leaves glabrous, pedicels slender, flowers small ..                        | .. 5. <i>P. lucida</i> .     |
| Leaves ferruginous-pubescent, pedicels short, flowers rather large .. .. . | .. 6. <i>P. dasyphylla</i> . |

### SPECIES IMPERFECTLY KNOWN.

- |                        |                            |
|------------------------|----------------------------|
| Leaves sessile .. .. . | .. 7. <i>P. sessilis</i> . |
|------------------------|----------------------------|

Leaves petiolate :—

- Leaves under 4 in. long, obovate or elliptic-obovate, more or less obtuse .. .. 8. *P. obtusifolia*.  
 Leaves over 4 in. long, oblong-lanceolate, acuminate .. 9. *P. selangorica*.

1. PAYENA MAINGAYI, Clarke in Hook. f. Fl. Br. Ind. III. 547 (1882). A large guttapercha-yielding tree, reaching 80 feet in height and a considerable girth; branchlets dark brown, smooth, younger branchlets and innovations rusty-tomentose; leaf-buds golden pubescent, scales .2 to .3 in. long, lanceolate. *Leaves* chartaceous; oblong, acuminate at the apex sometimes caudately sometimes abruptly, cuneate at the base; glabrous above except on the midrib, covered beneath with a silky golden-brown pubescence, afterwards glabrate; 6 to 9 in. long, 2 to 3 in. broad; midrib prominent, minutely pubescent above or glabrous; main-nerves 20 to 25 pairs, .3 to .5 in. apart, starting at an angle of about 70° with the midrib, at first parallel, ultimately ending in a looped intramarginal nerve; secondary nerves between the main-nerves, obscure like the reticulations; petiole 1 in. long, bordered above by the decurrent margins of the blade; stipules linear, subulate, .3 in. long, golden-pubescent, quickly caducous. *Flowers* fascicled, 2 to 6 together in the axils of the leaves; pedicels slender, .75 in. long, up to 1 in. in fruit and then thickened, clavate, brown-pubescent. *Calyx*-lobes 4, .4 to .5 in. long, densely brown-pubescent outside; outer pair valvate, ovate-acute, thick; inner pair imbricate, concave, keeled, acuminate, rather thin. *Corolla* white, campanulate, .6 to .8 in. long, glabrous; tube about .2 in. long; lobes 8, lanceolate, in 2 rows, the outer 4 enclosing the inner 4. *Stamens* 16, inserted on the top of the tube, .25 in. long; filaments thick; anthers as long as filaments, ovate, extrorse, crowned by a long mucro formed by the produced connective, the mucro ciliate or truncate or bifid at the apex. *Ovary* ovoid, pubescent, tapering into a subulate .8 in. long style, cells 8. *Fruit* an oblong, golden-pubescent or nearly glabrous berry up to 1.5 in. long by .8 in. broad, crowned by the remains of the persistent style, and supported by the persistent calyx-lobes, seeds 1 to 2. *Seeds* oblong, convex on one side, somewhat concave on the other, 1 to 2 in. long by .5 in. broad and .2 in. thick; testa light brown, shining, crustaceous; hilum conspicuous, slender; albumen thin; cotyledons oblong rounded, .8 in. long by .225 in. broad; radicle rather large, inferior. Pierre in Bull. Linn. Soc. Par. I. 526. *Chrysophyllum* ? *molle*, Wall. Cat. 4161.

PENANG: *Curtis* 1565. PERAK: *Scortechini* 172, 346; *Wray* 3423; *King's Collector* 7223, 7918; in open jungle or rich soil from 300 up to 2,000 feet. MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.)

990; Curtis 3483. SINGAPORE: Ridley 6239, 6497. Curtis says it is the "Taban Percha" of the Malays.

The drawing of the flower in Engl. & Prantl Naturl. Pflanzen-Fam. IV. i. 132, fig. 69 A-C seems a little doubtful. The identification of Wall. Cat. 4161 seems also doubtful, for *Payena Maingayi* much resembles in leaf *Palaquium Gutta* var. *oblongifolia*.

2. *PAYENA LONGIPEDICELLATA*, Brace MS. in Herb. Calc. A tree, reaching 100 to 130 feet in height; branches slender, silvery-grey, innovations rusty-pubescent. *Leaves* chartaceo-coriaceous; oblong or elliptic-oblong, shortly acuminate at apex, rounded unequally at the base; glabrous on both surfaces, margins slightly recurved; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 18 pairs, indistinct, starting at about 85° with the midrib, at first parallel, near the margin joined in an intramarginal looped nerve; secondary nerves nearly as prominent as main-nerves, often branching backwards, reticulations few, indistinct; petiole .7 to .8 in. long, channelled above and bordered by the margins of the decurrent blade; stipules small, ovate-acute, rusty-pubescent, very caducous. *Flowers* fascicled, 1-3 together, in the axils of lower leaves or of the scars of fallen leaves; pedicels 1 to 1.5 in. long, slender, curved, striate when dry, clavate above, puberulous; flower-buds conical, large. *Calyx-lobes* 4; 2 outer valvate, ovate-acute, thick, .5 in. long, sparsely rusty-pubescent; 2 inner lanceolate-acuminate, concave, thickly keeled, .6 in. long, densely tawny-pubescent on the back. *Corolla* tubular-campanulate, .8 in. long; tube .3 in. long, glabrous; lobes 8, 4 outer enclosing 4 inner, ovate-acuminate, glabrous. *Stamens* 16, inserted in 1 row, below the top of the tube but alternate ones covered by the others; filaments very short, slender; anthers .15 in. long, ovate, rusty-hirsute, extrorse, the connective produced in a broad mucro divided in 2 diverging lobes at the tip. *Ovary* oblong, style a little longer than the corolla-lobes. *Fruit* not known.

PERAK: King's Collector 2940.—DISTRIB. Borneo, *Haviland* 3035.

3. *PAYENA HAVILANDI*, King & Gamble, n. sp. A large tree (?); branchlets grey, slender, innovations appressed rusty-pubescent. *Leaves* chartaceo-coriaceous; elliptic, abruptly acuminate at apex, attenuate usually unequally at base; glabrous above, glabrous beneath except on the midrib which is appressed-rusty-pubescent, margins recurved; 2.5 to 3 in. long, 1.25 to 1.75 in. broad; midrib slender; main-nerves 10 to 12 pairs, not very prominent, rather irregular, starting at about an angle of 60° with the midrib, meeting close to the margin in an intramarginal looped nerve; secondary nerves and reticulations scanty but prominent, raised beneath; petiole .4 to .5 in. long,

channelled above and bordered by the decurrent margins of the blade; stipules small, ovate-falcate, densely ferruginous-pubescent. *Flowers* fascicled, 3-4 together, in the axils of upper leaves or of terminal leafless branchlets, giving the appearance of a terminal corymbose inflorescence; pedicels .8 to 1 in. long, densely rusty-pubescent, recurved; buds ovate, .25 in. long, obtuse. *Calyx-lobes* 4, outer pair rounded, thick, appressed pubescent to nearly glabrous; inner pair thinner, scarious, ciliate. *Corolla* campanulate, .3 to .4 in. long, longer than the calyx, glabrous; lobes 8, oblong, cordate at base, crenate or ciliate on the margins, veined; tube as long as lobes. *Stamens* 16, usually in 2 rows; filaments slender, glabrous; anthers ovate, the connective broad and produced in a broad glabrous acumen, sharp in bud, flattened later on. *Ovary* linear-oblong; style slender, .5 in. long. *Fruit* an obpyriform fleshy berry, 1.5 in. long and .75 in. broad, surmounted by the persistent conical style, seed 1. *Seed* oblong, 1 in. long, .6 in. broad, flattened; testa crustaceous, shining, chestnut-brown; hilum narrow, elongated; albumen thick; cotyledons broadly oblong, .5 in. long, nerved; radicle rather large, nearly .15 in. long.

KEDAH: Lankawi Island, *Ridley* 8329. PENANG: *Curtis* 777. SINGAPORE: *Ridley* 4959, 9203.—DISTRIB. Borneo, *Haviland* 2098, 2320.

P. CROIXIANA, Pierre in Bull. Soc. Linn. Par. I. 524 seems to be this species or very near it. The following is Pierre's description:—

A huge tree. *Leaves* oval or sub-oblong, long acuminate, glabrous; 2-3 in. long, .3 in. broad; main-nerves 24 to 28, petiole .25 in. *Flowers* 3, axillary, sub-terminal; peduncles .2 to .3 in. long, .6 in. in fruit. *Sepals* ovate, ciliate. *Corolla-tube* pubescent without; lobes oblong, truncate at the apex, ciliate; filaments very short; anthers sub-oblong with a long connective, obtuse, pilose on both sides. *Ovary* 8-celled, tomentose, urceolate at the base of the style. *Berry* oblong, .8-1.2 in. long, .5-6 in. broad, glabrous, 1-seeded; pericarp .06 in. thick; hilum under .04 in. broad, laterally extended over the whole height; cotyledons .8 in. long; .02 in. broad, radicle .14 in. long.

MALACCA: St. Pol Lias; Mad. Errington de la Croix in Paris Mus. "*Sundek*."

4. PAYENA LEERII, Benth. & Hook. f.; Pierre in Bull. Soc. Linn. Par. i. 524 (1885). A tree, reaching 80 to 100 feet in height and a considerable girth; branchlets grey, slender; innovations minutely rusty-pubescent. *Leaves* chartaceous; elliptic, abruptly acuminate at apex, acute or somewhat rounded at base; upper surface glabrous, shining, lower surface sparsely pubescent to glabrous; margins undulate, recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib prominent, impressed



above; main-nerves 14 to 18 pairs, slender, about .2 in. apart, inconspicuous, more or less parallel, starting at an angle of about  $80^\circ$  with the midrib, straight almost to the margin where they are connected by a looped intramarginal nerve; secondary nerves many, forking backwards, reticulations faint; petiole slender, .75 in. long, channelled above by the decurrent margins of the blade; stipules short, subulate, pubescent, very caducous. *Flowers* fascicled, 3-4 together, in the axils of upper leaves, or on terminal leafless branchlets, giving the impression of a terminal inflorescence; pedicels slender, .4 in. long, pubescent. *Calyx-lobes* 4, .15 in. long, the 2 outer ovate-valvate, minutely pubescent; the 2 inner ovate, truncate at apex, almost scarious on the margins, pubescent, imbricate. *Corolla* campanulate; tube .05 in. long, glabrous; lobes 8, imbricate, the 4 rather smaller outer embracing the 4 larger inner, ovate-obtuse, .15 in. long. *Stamens* 16, inserted in one row on the top of the corolla-tube, those opposite the lobes longer than and behind those alternate with them; filaments very short, hairy; anthers ovate, .075 in. long, extrorse, the connective produced in a rather thick penicillate mucro. *Ovary* villous, depressed, obscurely 8-lobed; style subulate, glabrous above, pubescent below, .2 in. long; cells 8. *Fruit* an ovate-oblong conical reddish-green berry, 1.5 to 1.75 in. long, obscurely ribbed and rough, at first tipped with the conical remains of the style, afterwards truncate seed 1. *Seed* 1 in. long, about .4 in. broad, oblong; testa thin crustaceous, dark brown; hilum long, narrow; albumen thin; cotyledons oblong, .85 in. long, .35 in. broad, faintly 3-nerved; radicle small, inferior. Kurz in Journ. As. Soc. Beng. XL. (1871) II. 69; Burck in Ann. Jard. Buit. V. (1885) 56, tab. VIII.; Engl. and Prantl Pflanzenfam. IV. i. 133, fig. 70. *Keratephorus Leerii*, Hassk. Retzia I. (1856) 101; Miq. Fl. Ind. Bat. II. 1039. *Azaola Leerii*, Teysm. & Binnend. in Nat Tijdschr. Neerl. Ind. VI. 116.

PERAK: Wray 1539, at 4,900 feet on Batang Padang; *King's Collector* 523. SINGAPORE: *Cantley* 20.—DISTRIB. Sumatra, Bangka, Borneo (?), Amboina. Vern. "Getah Sundek." It gives a second-rate variety of guttapercha.

To this species probably belong *Ridley* 11313, *Curtis* 3631, and *David* 10857, all apparently from Sumatra—Vern. "Getah Sundi." The specimens have leaves only.

*Curtis'* No. 3640 "Getah Sundek" from the Dindings is either this species or *P. Havilandi*; but the fruit is globose, not elongate or obconical. It seems, however, to have been more or less attacked by insects, and may not show its proper shape.

5. PAYENA LUCIDA, A. DC. Prod. VIII. 197 (1844). An evergreen tree

reaching a height of 60 feet and considerable girth; branchlets slender, dark brown, innovations rusty-tomentose. *Leaves* chartaceous; elliptic, elliptic-oblong or elliptic-lanceolate, obtusely and rather abruptly caudate-acuminate at apex, acute at base and unequal-sided; glabrous on both surfaces, the margins slightly recurved; 4 to 5 in. long, 1·5 to 2 in. broad; midrib prominent, slender; main-nerves 10 to 12 pairs, not prominent, rather irregular, 3 to 4 in. apart, starting at an angle of about 60° with the midrib, straight at first, arching near the margin to meet in a looped intramarginal nerve; secondary nerves and reticulations rather scanty; petiole 4 in. long, channelled above; stipules very minute, linear, silky-pubescent, caducous. *Flowers* fascicled, 1 to 4 together, in the axils of upper leaves; pedicels slender, 7 to 8 in. long, somewhat clavate, minutely silky; buds conical, 1 to 2 in. long. *Calyx-lobes* 4, 2 outer valvate, thick, enclosing 2 inner, broad, ovate, obtuse, ciliate, often scarious on the margins, 2 in. long. *Corolla* white, campanulate, 2 to 3 in. long; tube short; lobes 8, oblong, obtuse or rounded in 2 rows, 4 outer enclosing 4 inner. *Stamens* 16, 12 in. long; filaments short, thick; anthers ovate, the connective produced into an obtuse, glabrous, often bifid acumen, cells extrorse. *Ovary* villous, rounded; style subulate, glabrous, 3 in. long, 6-celled. *Fruit* an oblong, ferruginous-pubescent berry, 1 to 1·5 in. long, 7 in. broad, 1-seeded. *Seed* oblong, bluntly acute at both ends, flattened, 8 in. long, 5 in. broad, 3 in. thick; testa chartaceous, chestnut-brown, shining; hilum about 15 in. broad occupying the whole inner edge; albumen thick; cotyledons oblong, thin, flat, faintly nerved as the leaves, 6 in. long, 4 in. broad; radicle rather large, inferior. Kurz For. Fl. II. 121, Journ. As. Soc. Beng. XL. ii. 69, and XLVI. ii. 230; Clarke in Hook. f. Fl. Br. Ind. III. 547; Pierre in Bull. Soc. Linn. Par. I. 525. *Mimusops lucida*, Wall. Cat. 4147; G. Don Gen. Syst. IV. 35 (not of Poir.).

PENANG: Wallich 4147. PERAK: Scortechini 1989; Wray 2266, 3114, 3191, 3482; King's Collector 3364, 3734, 6636. SINGAPORE: Lobb 307; Ridley.

VAR. *Wightii*, Clarke in Hook. f. Fl. Br. Ind. III. 548. *Leaves* large, up to 6 in. long and 2·5 broad, coriaceous; pedicels stout; sepals large, rusty-tomentose. *Payena polyandra*, Bth. & Hook. f.; Pierre in Bull. Linn. Soc. Par. I. 526. *Isonandra polyandra*, Wight Ic. t. 1589. *Keratephorus Wightii*, Hassk. in Retzia I. 101.

Of this variety Clarke makes two forms, which he distinguishes chiefly by the former having short acuminations to the leaves, the latter long acuminate leaves. We have separated the material into these two groups as well as we can.

Form (1): Leaves up to 6 in. long, 2·5 in. broad, abruptly acuminate, shining

above, ferruginous-red beneath when dry; flower-buds ovoid, .2 in. long or more, rusty-pubescent. Pedicels stout, clavate; fruit oblong, depressed at top; anther-connective not so broad as in *P. lucida*.

MALACCA: Griffith (K.D.) 3605 (part); Maingay (K.D.) 194; Hervey; Derry 937; Holmberg 794; Goodenough 1977. PERAK: King's Collector 8705.

Form (2): Leaves up to 6 in. long, oblong-lanceolate, long-acuminate, reddish beneath when dry; nerves more prominent than in *P. lucida*; pedicels slender, .8 to 1.2 in. long; buds ovoid, sometimes flattened, .2 to .3 in. long, rusty-pubescent; young fruit oblong conical, tipped by the persistent style; old fruit oblong, over 1 in. long. *P. costata*, King MS. in Herb. Calc.

MALACCA: Griffith (K.D.) 3605 (part); Maingay (K.D.) 989; Goodenough 1853; Derry 654; Curtis 3644, 3660. PENANG: Curtis 1516. PERAK: King's Collector 3734, 4081, 7842, 7957, 10466, 10496, 10978. PAHANG: Ridley 2672. SELANGOR: Goodenough 10545. SINGAPORE: Ridley 3995, 5070, 6508, 11305.

VAR. *nigra*, King & Gamble. Leaves much larger than in the specimens of true *P. lucida*, elliptic, long caudate-acuminate at apex, more or less rounded at base, undulate on the margins, 6 to 8.5 in. long, 2.5 to 4 in. broad; main-nerves and intramarginal nerve very prominent, raised beneath; flower-buds and pedicels often golden-pubescent. Flowers as in *P. lucida*.

PERAK: Wray 1170; Scortechini.

P. LOWIANA, Pierre in Bull. Soc. Linn. Par. I. 524, seems to be one of the varieties of *P. lucida* or a species allied to it. The following is Pierre's description:—

A huge tree. Leaves with petiole .4 in. long; blade 5 in. long, 1.2–1.6 in. broad, oblong-lanceolate, obtusely acuminate, glabrous; main-veins 24, distant. Fruiting peduncles axillary, 1–1.2 in. long, solitary. Berry oblong, 1.3 in. long by .8 in. broad, sub-glabrous, crowned at the top with the remains of the style. Seed solitary, 1.1 in. long, .35 in. in diam., erect; hilum lateral, .08 in. broad; cotyledons oblong, attenuate at the apex, .8 in. long by .2 in. broad; radicle .15 in. long. *P. lucida* MS. in Herb. Mus. Par.

PERAK: Sir Hugh Low; St. Pol Lias No. 272.

6. PAYENA DASYPHYLLA, Pierre in Bull. Soc. Linn. Par. I. 527 (1885). A large tree, reaching 80 to 100 feet in height and considerable girth; branches spreading, branchlets greyish-brown, moderately thick; innovations densely ferruginous-pubescent. Leaves membranous; oblong or elliptic-oblong or obovate-oblong, often unequal-sided; acuminate at apex, acute, cuneate or somewhat rounded at base; glabrous above except on the midrib and near the base, densely ferruginous-pubescent beneath, when old nearly glabrous; 4 to 8 in. long, 1.5 to 3 in. broad; midrib thick, pubescent on both surfaces; main-nerves 12 to 16 pairs, unequally spaced, starting at about 60° with the midrib, produced straight to meet a looped intramarginal nerve; secondary

nerves rather prominent, reticulations irregular; petiole .5 in. long, thick, densely rusty-pubescent, channelled above; stipules subulate, rusty-pubescent, short, early caducous. *Flowers* fascicled, 1 to 3 together, in the axils of the leaves; pedicels thickly rusty-pubescent, .4 to .6 in. long, somewhat enlarged in fruit; buds ovoid. *Calyx-lobes* 4, 2 outer thick, valvate, .3 in. long, triangular-rounded, densely rusty-pubescent; 2 inner concave, slightly imbricate, .35 in. long, thickly keeled, scarious on the margins and ciliate, rusty-pubescent around the keel. *Corolla* tubular-campanulate, .3 in. long; tube .1 in. long, glabrous; lobes 8, the 4 outer enclosing the 4 inner but inserted in one row, oblong, obtuse. *Stamens* 16, .175 in. long, inserted on the top of the tube; filaments .05 in. long, villous; anthers nearly linear, extrorse, the connective produced in a .05 in. long, blunt or even bifid acumen. *Ovary* conical, villous as is the base of the .35 in. long subulate style. *Fruit* an ovoid densely tawny-pubescent berry .75 to 1 in. long, umbonate at the tip and crowned with a portion of the style. *Seeds* .4 to .5 in. long, elliptic-acute; testa dark brown, shining; hilum narrow; albumen thin. Burck in Ann. Jard. Buit. V. 51. *Isonandra dasyphylla*, Miq. Pl. Jungh. 201 and Fl. Ind. Bat. II. 1038; de Vriese Journ. Bot. Neerl. I. 256.

PERAK: *Scortechini* 1242; *King's Collector* 2611, on Larút Peak at 3,000 to 3,500 feet.—DISTRIB. Sumatra, Java.

De Vriese says the gutta is only used for adulteration, but that Motley did not agree in this belief.

VAR. *glabrata*, King & Gamble. Lower surface of the leaves nearly glabrous, apex abruptly long-acuminate; pedicels .8 to 1 in. long; fruit nearly spherical.

PERAK: *Scortechini* 536. SINGAPORE: at Selitar, *Ridley* 5644.

7. *PAYENA SESSILIS*, King & Gamble, n. sp. A tree (?); branchlets grey, rough, uppermost somewhat angular when dry. *Leaves* coriaceous, sessile; obovate, obtuse or emarginate; glabrous on both surfaces, margins recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces; main-nerves not prominent on the upper surface, raised on the lower, about 8 pairs, at about 50° with the midrib, straight but soon anastomosing with the prominent reticulations which are also raised on the lower surface; stipules ovate, acute or obtuse, glabrous, caducous. *Flowers* fascicled, 2 to 3 together, on small tubercles in the axils of upper leaves; pedicels slender, black, .5 in. long, supported by small hard glabrous bracts. *Calyx-lobes* in fruit 4, .2 in. long, ovate-acute, glabrous; rest of flower not seen. *Fruit* a globose glabrous berry, black when dry, prominently surmounted by the

persistent long curved style; cells apparently 4 to 6. *Seeds* oblong, obtuse at top, acute at base, .3 to .4 in. long, rounded on the outer, straight on the inner side; hilum long, narrow; testa thin crustaceous, brown; albumen rather thin; cotyledons oblong, flat, .15 to .2 in. in length; radicle rather large,

SINGAPORE: *Ridley* 5076.

8. *PAYENA OBTUSIFOLIA*, King & Gamble, n. sp. A tree; branchlets stout, greyish-brown, prominently marked by the scars of fallen leaves and the tubercles of fallen flower fascicles, young branchlets and leaves rusty-brown in colour. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or elliptic-obovate, obtuse, emarginate or shortly acute at apex, cuneately attenuate at base; glabrous on the upper surface, rusty-coloured and sometimes pubescent on the lower; 2.5 to 3 in. long, 1 to 1.5 in. broad; midrib stout, main-nerves 10 to 12 pairs, starting at about 60° with the midrib, slightly curving upwards, inconspicuous above as are the reticulations; petiole .5 to .75 in. long, channelled above by the decurrent margins of the blade. *Flowers* fascicled, 4 to 8 together (to judge by scars only) in the axils of the leaves, or of the scars of fallen leaves; pedicels .5 in. long, clavate, pubescent; buds about .3 in. long, truncate. *Calyx-lobes* 4, 2 outer valvate, ovate-acute, .3 in. long, pubescent; 2 inner imbricate, ovate, golden-pubescent on the back, ciliate on the margins. *Corolla* not seen. *Ovary* ovoid-conical, glabrous, 8-celled; style .35 in. long, linear. *Fruit* not seen.

PERAK: *Scortechini* 340.

9. *PAYENA SELANGORICA*, King & Gamble, n. sp. A tree (?); branchlets dark brown, rough. *Leaves* chartaceo-coriaceous; oblong-lanceolate, acuminate at apex, narrowly attenuate at base, glabrous above, slightly pubescent on the sides of the midrib beneath; 4 to 6 in. long, 1 to 1.7 in. broad; midrib prominent, impressed and keeled above; main-nerves about 16 pairs, indistinct, parallel, at about 80° with the midrib, straight at first, anastomosing near the margin with the secondary nerves and reticulations, which are visible but not prominent; petiole .5 to .7 in. long, channelled above, enlarged at base. *Flowers* fascicled, 2 to 3 together, in the axils of the leaves; pedicels rather thick, .6 to .8 in. long, striate, appressed rusty-pubescent. *Calyx-lobes* 4, outer pair valvate .3 in. long, ovate-acute, thick below, thinner above; inner pair ovate, .25 in. long, scarious on the margins; both appressed rusty-pubescent; rest of flower not seen. *Ovary* pubescent, cylindrical, depressed at top; fruit immature, seed apparently albuminous, with an elongated hilum.

SELANGOR: *Ridley* 7387.

6. *BASSIA*, Linn.

Trees with milky juice. *Leaves* coriaceous or chartaceous, often clustered at the ends of the branchlets; stipules caducous. *Flowers* fascicled, in the axils of the leaves or of the scars of fallen leaves, pedicellate, pedicels frequently reflexed. *Calyx-lobes* 4, the 2 outer usually valvate, enclosing the 2 inner imbricate. *Corolla* campanulate; tube broad; lobes 6 to 12, contorted in bud, erect in flower, imbricate. *Stamens* twice the number of the corolla-lobes or more, inserted in one or more rows on the corolla-tube; filaments usually short; anthers generally lanceolate, laterally or extrorsely dehiscent; connective generally produced in an acumen; staminodes none. *Ovary* villous, 4-12- (usually 6-8-) -celled; style linear, subulate, more or less elongate. *Fruit* a globose or oblong or ovoid berry, few-seeded. *Seeds* ellipsoid, usually compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen none; cotyledons thick, fleshy; radicle small.—*DISTRIB.* About 40 species, found in India, Ceylon, the Malay Peninsula, and Malay Archipelago.

In several of the species the fruit is unknown, and some of these may prove, when it becomes available, to belong to *Payena*, which is hardly separable except by the important character of having albuminous seeds and leafy cotyledons.

We have not followed Baillon and Engler in changing the name of this genus to *Illipe*, as we agree in the opinions expressed by Drs. Trimen ("Flora of Ceylon") and Cooke ("Flora of Bombay") that the word *Illipe* was not intended by König to be employed as the name of a genus, but was merely mentioned as being the vernacular name employed by the natives of Malabar for one of the species.

- Flower-buds large, nearly .75 in. long, conical; intramarginal nerve of leaves prominent; pedicels thick, 1.5 to 2 in. long .. 1. *B. aristulata*.  
 Flower-buds moderately large, about .4 in. long, globose; intramarginal nerve present; pedicels short, about .4 in. long :—  
     Intramarginal nerve conspicuous; leaves 10 to 14 in. long .. 2. *B. Kingiana*.  
     Intramarginal nerve faint; leaves 4 to 6 in. long .. 3. *B. Kunstleri*.  
 Flower-buds moderately large, .4 in. long or rather less, conical :—  
     Leaves large, over 6 in. long; main-nerves prominent :—  
         Pedicels over 1 in. long; leaves coriaceous, silky-pubescent beneath; main-nerves straight, intramarginal nerve present; connective of anthers penicillate .. .. 4. *B. penicillata*.  
         Pedicels under .6 in. long; leaves chartaceous, sparsely pubescent beneath; main-nerves curved, no intramarginal nerve; connective of anthers not penicillate .. .. 5. *B. malaccensis*.  
     Leaves moderate-sized, under 6 in. long; main-nerves not prominent .. .. 6. *B. Curtisii*.  
 Flower-buds small, under .3 in. long, usually conical, generally in many-flowered fascicles :—  
     Pedicels usually under .5 in. long :—  
         Pedicels and flower-buds densely tawny-pubescent; connective of anthers produced in a long point .. .. 7. *B. laurifolia*.

Pedicels and flower-buds thinly rusty-pubescent; connective of anthers produced in a short ciliate point .. .. 8. *B. rupicola*.  
 Pedicels .5 in. long or longer :—

Flowers fascicled in the axils of upper leaves generally, rarely on old wood below them :—

Leaves glabrous, coriaceous, main-nerves indistinct .. 9. *B. perakensis*.

Leaves grey-silky-pubescent beneath, almost coriaceous, main-nerves distinct but not prominent .. .. 10. *B. argentea*.

Leaves only slightly pubescent beneath, chartaceous, main-nerves very prominent .. .. 11. *B. Braceana*.

Flowers fascicled chiefly in the axils of the scars of fallen leaves, on old wood :—

Leaves chartaceous, elliptic; main-nerves prominent .. 12. *B. longistyla*.

Leaves coriaceous, oblong; main-nerves not prominent :—

Main-nerves of leaves (under 6 in. long) curved upwards, but no intramarginal nerve; anther-connective long-apiculate .. .. 13. *B. cuprea*.

Main-nerves of leaves (over 6 in. long) meeting in an intramarginal nerve; anther-connective shortly apiculate .. .. 14. *B. Motleyana*.

#### SPECIES OF WHICH FLOWERS ARE IMPERFECTLY KNOWN.

Leaves under 5 in. long, obovate, obtuse, greenish-brown when dry .. .. 15. *B. cuneata*.

Leaves 5 to 7 in. long, oblong-lanceolate, greyish-green when dry .. .. 16. *B. penangiana*.

Leaves 6 to 8 in. long, obovate-oblong, orange-red when dry .. 17. *B. erythrophylla*.

1. *BASSIA ARISTULATA*, King & Gamble, n. sp. A tree; branchlets stout, brown, lenticellate. *Leaves* coriaceous; oblong, shortly and rather suddenly acute at apex, somewhat rounded unequally and then decurrent at base; glabrous on both surfaces except on the midrib beneath; margins slightly recurved; 6 to 10 in. long, 3 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 28 pairs, conspicuous, parallel, .3 to .4 in. apart, starting at about 75° with the midrib, scarcely curved, meeting in a conspicuous intramarginal looped nerve; reticulations oblique, not prominent; petiole 1.5 to 2 in. long, grooved above, much thickened below. *Flowers* fascicled, about 2 to 6 together, in the axils of the leaves or of the scars of fallen leaves, on very short tubercles; pedicels thick, 1.5 to 2 in. long, densely golden-pubescent, flattened under the flower; buds elongate, conical, nearly .75 in. long. *Calyx-lobes* 4, .5 to .7 in. long; the 2 outer valvate, triangular-ovate, pubescent; the 2 inner imbricate, concave, ovate, pubescent. *Corolla-tube* short, .2 to .3 in. long, funnel-shaped, densely pubescent inside; lobes 8 to 9, oblong-lanceolate, .4 in. long, pubescent without. *Stamens* many, up to 36, in 2 or 3 rows, lowest row about 8 to 9, second row 16 to 18, third row 8 to 9, inserted on the top of the corolla-tube; filaments very short, pubescent; anthers

oblong, thin, .2 in. long, opening along their edge; connective black, prominent, ending in a long sharp awn, the anthers usually twisted half round. *Ovary* silky-pubescent, flat at top, style glabrous about equal to corolla, cells 10 to 12. *Fruit* not known.

PERAK: at Goping, *Scortechini* 1984.

Said by *Scortechini* to give a guttapercha.

2. *BASSIA KINGIANA*, Brace MS. in Herb. Calc. A tree, reaching 50 to 60 feet in height, and 10 to 15 in. in diam.; branchlets thick. *Leaves* coriaceous, dark green; obovate-oblong, rounded and then shortly and abruptly acuminate at apex, cuneate at base; glabrous on both surfaces, margins slightly reflexed; 10 to 14 in. long, 3.5 to 4.5 in. broad; midrib very strong, prominent; main-nerves about 20 pairs, conspicuous, .5 to .7 in. apart, starting nearly at right angles to the midrib and curving upwards to meet in a conspicuous intramarginal looped nerve; secondary nerves few but prominent; reticulations distant, not numerous; petiole 2 in. long, grooved above, swollen at base, and then conspicuously rugose when dry; stipules subulate-acuminate from a broad base, very quickly caducous. *Flowers* fascicled, about 3 to 5 together, on small tubercles above the scars of fallen leaves on the previous year's wood; pedicels recurved, thick, .4 in. long, enlarged above, covered as also the calyx with appressed tawny pubescence; buds globose, about .4 in. long. *Calyx-lobes* 4, .4 in. in diam.; outer 2 imbricate, rounded emarginate, thick; inner 2 also imbricate, concave, ciliate on the margins. *Corolla-tube* funnel-shaped, .15 in. long, rusty-hirsute without, pubescent within; lobes 12 to 16, white, much imbricate or in 2 rows, spatulate, ciliate on the margins, hirsute, .25 in. long. *Stamens* many, 32 to 36, in 2 rows on the top of the corolla-tube; filaments .1 in. long, rather stout, densely hirsute; anthers linear-oblong, .125 in. long; connective produced into a broad appendage, penicillate at tip, in bud merely aristate. *Ovary* rounded, villous; style thick, curved, pubescent, .3 in. long, with minute stigmatic lobes; cells about 8. *Fruit* a globose, thickly tawny-pubescent, berry, .75 in. in diam., surmounted by the long subulate persistent style, seeds 1 to 2. *Seed* not seen.

PERAK: *King's Collector* 3314, 3678, 7389; in open jungle at 300 to 500 feet. SINGAPORE: *Ridley* 6238, 6294.

3. *BASSIA KUNSTLERI*, Brace MS. in Herb. Calc. A tree with spreading branches, reaching a height of 30 to 40 feet and 10 to 15 in. in diam.; branchlets slender, grey, innovations rusty-pubescent. *Leaves* chartaceous; obovate-oblong or oblong, abruptly acuminate at apex, acuminate at base, glabrous on both surfaces; 4 to 6 in. long,



1·5 to 2 in. broad; midrib slender, prominent; main-nerves 15 to 20 pairs, starting at an angle of about 60° to the midrib and curving upwards to meet in a faint intramarginal looped nerve; secondary nerves and reticulations prominent; petiole slender, 1 to 1·5 in. long, bordered above in its upper part by the decurrent margins of the blade, base enlarged, sometimes twisted. *Flowers* solitary or fascicled 2 to 3 together in the axils of the leaves, or above the scars of fallen leaves; pedicels thick, ·3 to ·4 in. long, usually recurved, densely rusty- or golden-pubescent like the calyx-lobes and fruit; buds ovoid-orbicular about ·4 in. long. *Calyx-lobes* 4, ·4 in. long; outer valvate, ovate-orbicular; inner imbricate, concave, somewhat emarginate, thin and ciliate on the edges. *Corolla* tubular-campanulate; tube about ·125 in. long, glabrous on both sides; lobes 16, in 2 rows, very much imbricate, shortly spatulate, rounded at top, fimbriate on the margins, shortly pubescent within, 3-nerved. *Stamens* about 32, in 2 rows, mixed with long unicellular brown hairs; filaments thick, about 0·5 in. long; anthers oblong, opening by marginal slits, often twisted half round; connective conspicuous, produced in a sharp mucro. *Ovary* rounded, villous; style subulate, ·5 to ·7 in. long; cells about 8. *Fruit* an ovoid densely pubescent brown berry, ·8 to 1 in. long, 1-2-seeded, surmounted by the persistent style. *Seed* ovoid, obliquely pointed below, rounded above, ·7 in. long, ·4 in. in diam., sometimes flattened on one side; testa thin, crustaceous, chestnut-brown, shining; hilum very large, obovate; albumen none; cotyledons thick, ·5 in. long, ovate; radicle small, pointed.

PERAK: on Larut peak, at 500 to 2,600 feet, *King's Collector*, 3241, 3547, 3964, 6410; *Wray* 2643, 3201; *Curtis* 3694; *Ridley* 5536.

4. *BASSIA PENICILLATA*, King & Gamble, n. sp. A large tree, reaching 60 feet in height with a girth of 4 feet; ultimate branchlets and innovations densely ferruginous-pubescent. *Leaves* coriaceous; oblong or somewhat obovate-oblong, shortly and abruptly acute at apex, unequally rounded at base; glabrous above, thickly golden-silky-pubescent beneath when young, afterwards glabrate; margins recurved; 6 to 10 in. long, 2·5 to 3·5 in. broad; midrib thick, prominent, impressed and keeled above; main-nerves 24 to 28 pairs, conspicuous, parallel, ·3 to ·5 in. apart in large leaves, starting at about 80° with the midrib, curved only near the margin to meet in an inconspicuous looped intramarginal nerve; secondary nerves many in large leaves; reticulations oblique, not prominent; petiole 1·2 to 1·5 in. long, thickened below. *Flowers* fascicled, about 1 to 4 together in the axils of the leaves, on very short rusty-pubescent tubercles; pedicels 1 to 1·2 in. long, slender, pubescent; buds conical. *Calyx-lobes* 4, sometimes 5, ·4 in. long; outer pair ovate-acuminate, densely rusty-pubescent, thick; inner pair,

sometimes 3, ovate acuminate, thinner, pubescent on the back, ciliate and more or less scarious on the margins. *Corolla* campanulate, .4 in. long; tube nearly .2 in. long, glabrous outside, densely ferruginous hairy within in the upper half; lobes 10 (?), lanceolate, acuminate, as long as tube. *Stamens* 20 in 1 row, but the 10 opposite the corolla-lobes behind the 10 alternate with them; filaments .05 in. long, hairy; anthers linear-sagittate, extrorse, the connective produced in a long penicillate acumen. *Ovary* rounded, densely hairy, as is the lower half of the .75 in. long slender style; cells 10. *Fruit* not known.

PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3737, said to be common. Vern. name "*Minjato*."

In its leaves this species greatly resembles *B. aristulata*, but the slender pedicels, smaller flowers, acuminate calyx, and penicillate anthers at once distinguish it.

5. *BASSIA MALACCENSIS*, King & Gamble. A large tree(?); branchlets dark brown, rough, with prominent old leaf-scars, innovations nearly glabrous. *Leaves* chartaceous or almost membranous; obovate or obovate-oblong, obtuse or shortly and abruptly acute at apex, cuneate at base; glabrous above, sparsely and minutely pubescent beneath when young, glabrous when old; 6 to 12 in. long, 4 to 6.5 in. broad; midrib prominent, thick; main-nerves very conspicuous, 14 to 16 pairs, parallel, in average leaves .5 in. apart, in large ones often nearly 1 in., starting at an angle of 60° with the midrib, at once curving gently upwards to and along the margin; secondary nerves few, reticulations mostly transverse, not prominent; petiole 1 to 2 in. long, slightly bordered above to about half-way down by the decurrent margins of the blade, base much swollen, wrinkled. *Flowers* fascicled 4 to 8 together in the axils of the leaves or of the scars of fallen leaves, on rather thick pubescent tubercles; pedicels .4 to .6 in. long, pubescent; buds when young rounded-conical. *Calyx-lobes* 4; 2 outer valvate or slightly imbricate, ovate, bluntly acute or mucronate, rusty-pubescent, .25 in. long; 2 inner imbricate, ovate-acute, margins sometimes scarious, sometimes ciliate, back thickly rusty-pubescent, more or less keeled. *Corolla* campanulate; tube very short, rarely .1 in. long, with a short ring of hairs at the mouth inside; lobes 10-12, lanceolate, obtuse, sub-2-seriate, .25 to .3 in. long, glabrous except for a few stiff hairs outside. *Stamens* 20 to 24 in 2 rows; the inner almost or quite sessile, alternate with the corolla-lobes; the outer with short densely pubescent filaments, longer than the inner ones; anthers narrowly lanceolate with long hairs, opening on the margins; connective produced in a long hair-like acumen. *Ovary* hairy, elongate, conical, style .25 in. long. *Fruit* a fleshy obovate-oblong berry with somewhat flattened top, surmounted

by the persistent base of the style and supported by the persistent calyx-lobes, nearly 1 in. long. *Seed* 1, oblong, acute at the top, .7 in. long, .35 in. broad, and about .3 in. thick; testa shining, crustaceous, chestnut-brown; hilum .15 to .2 in. broad; albumen none; cotyledons thick, inner face somewhat striate; radicle rather large, inferior. *Payena malaccensis*, Clarke in Hook. f. Fl. Br. Ind. III. 547. *Keratephorus Wightii*, Maingay MS. (not of Hassk.).

MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.) 992. PERAK: *Wray* 1229; *Scortechini* 314. SINGAPORE: *Ridley* 2082, 2757, 5643, 6042, 6132, 6133, 6498, 6499, 6500, 6531, 8078, 10159.

Wray says this species gives only a sticky gutta in small quantities.

6. *BASSIA CURTISII*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; branches greyish-brown, strongly marked by the scars of fallen leaves and the prominent tubercles of fallen flowers, innovations very slightly rusty-pubescent, thick. *Leaves* very coriaceous; clustered at the ends of the branchlets, obovate or sometimes lanceolate-obovate, obtuse emarginate or very suddenly and shortly blunt-acuminate; glabrous on both surfaces, margins strongly recurved; 4 to 6 in. long, 1.25 to 2.5 in. broad; midrib stout, prominent; main-nerves not prominent, 14 to 15 pairs, at an angle of about 70° with the midrib, .3 to .4 in. apart, straight, joined near the margin by a looped intramarginal nerve; secondary nerves prominent, reticulations few; all raised on the under surface; petiole .7 to 1 in. long, rather thick, bordered by the decurrent margins of the blade, base swollen. *Flowers* fascicled, many (10 to 12) together on prominent tubercles in the axils of the scars of fallen leaves below the leaf-cluster, and covering the branchlets densely for a distance of about 4 in.; pedicels .25 (buds) to .5 (flower) in. long, somewhat angular, decurved, densely pale tawny-pubescent; buds ovoid-conical. *Calyx-lobes* rounded, obtuse, densely tawny-pubescent, .2 in. long, the outer pair thick, the inner somewhat keeled, scarious on the margins. *Corolla* campanulate, rather longer than the calyx; tube short, glabrous except for the ring of hairs at the insertion of the stamens; lobes 8, oblong spathulate, ciliate and hirsute at the tip. *Stamens* 16; filaments short, slender, villous; anthers ovate-acute, the connective ending in a sharp conical acumen, extrorse. *Ovary* rounded, villous; style thick glabrous, stigmas minute; cells 8. *Fruit* an oblong berry, covered without with appressed golden pubescence, .5 to .7 in. long, .5 in. broad, crowned with the persistent style and supported by the persistent calyx; seeds 1-2, placentas thin. *Seeds* oblong, pointed at the ends; testa crustaceous, shining; hilum narrow; albumen none; cotyledons thick, fleshy, radicle small.

PENANG: *Curtis* 1451, 3536. PERAK: *Wray* 512, Vern. "Gutta Gannu"; *Scortechini* 1408.

This species comes near both to *B. Motleyana*, from which it differs in having more coriaceous leaves, larger flowers, and a pubescent fruit; and to *B. cuneata*, in which the leaves (judging from the poor specimens in Kew Herbarium) are thinner and the fruit larger and nearly glabrous, with more rounded seeds and a broad hilum.

7. *BASSIA LAURIFOLIA*, King & Gamble, n. sp. A tree reaching 60 feet in height and a diam. of 12 to 18 in.; branches spreading; branchlets pale brown, rather thick, innovations densely pubescent with yellowish-tawny hairs. *Leaves* chartaceous; obovate-lanceolate, gradually acuminate at apex, also at base; glabrous on both surfaces except on the sides of the midrib beneath; 5 to 10 in. long, 1·5 to 3·5 in. broad; midrib prominent, impressed and keeled above; main-nerves prominent, regular, 14 or 15 pairs, about ·3 in. apart, starting at about 45° with the midrib, gradually curving upwards; reticulations obliquely transverse, faintly marked; petiole ·75 to 1 in. long, slender, glabrous above, tawny-pubescent at base, bordered by the decurrent margins of the blade and marked above by the produced keel of the midrib; stipules linear-subulate, tawny-pubescent, nearly ·5 in. long, very caducous. *Flowers* fascicled, about 6 together, on hairy tubercles in the axils of the leaves or of the scars of fallen leaves near the top of the branchlets; pedicels ·4 to ·5 in. long, usually recurved, densely tawny-pubescent, thicker in fruit; buds small, conical. *Calyx-lobes* 4, about ·2 in. long, rather narrowly ovate; the outer pair obtuse; the inner acute, all densely tawny-pubescent without, glabrous within. *Corolla* campanulate; tube ·05 in. long with a ring of hairs at the mouth inside; lobes 8, oblong-spathulate, ·1 in. long, glabrous. *Stamens* 14 to 16, ·1 in. long; filaments short, thickly hairy; anthers linear-sagittate, the connective produced in a long sharp acumen. *Ovary* rounded, glabrous; style slender, ·3 in. long; cells apparently 8. *Fruit* a black glabrous oblong berry about ·6 to ·7 in. long and ·4 in. broad. *Seed* 1, ovoid, ·5 to ·6 in. long, slightly compressed; testa thin, crustaceous, shining, dark brown; hilum broad; albumen none; cotyledons oblong, fleshy, about ·3 in. long and nearly ·2 in. broad; radicle inferior, rather large.

PERAK: on low ground, *King's Collector* 3104, 3718, 3720.

VAR. *obtusa*, King & Gamble. *Leaves* obtuse with an abrupt acumen. *Calyx-lobes* obtuse, thickened at tip. *Corolla-lobes* ciliate at the apex, glandular-striate; anthers and produced connective very hirsute.

PENANG: *Curtis* 159, 2254, 3589—a small tree, fairly common.

VAR. *parvifolia*, King & Gamble. *Leaves* smaller than in type;

innovations not tawny-pubescent. *Calyx-lobes* more rounded and glabrous; pedicels longer.

KEDAH: on Kedah Peak, *Ridley* 5506.

Ridley's No. 2673 from Tahan Woods, Pahang, is very near *B. laurifolia*, but the pedicels are much longer and the calyx-lobes not tawny-pubescent. The material is insufficient for description.

8. *BASSIA RUPICOLA*, King & Gamble, n. sp. A tree reaching 40 to 60 feet in height and 15 to 20 in. in diam.; branchlets dark grey, marked by the prominent scars of fallen leaves, innovations puberulous; leaf-bud scales ovate-lanceolate, .25 in. long. *Leaves* coriaceous; obovate-oblong, bluntly acute at apex, cuneately attenuate at base; dull and glabrous on both surfaces; 3.5 to 5.5 in. long, 1.5 to 2 in. broad; midrib thick, conspicuous; main-nerves 8 to 10 pairs, starting at an angle of 45° with the midrib, then curving upwards, sometimes rather indistinct, about .4 in. apart; reticulations many, obscure, obliquely transverse; petiole .5 to 1 in. long, grooved above and bordered by the decurrent base of the blade, swollen below. *Flowers* fascicled, about 5 together, in the axils of the leaves, on small tubercles; pedicels .15 in. long, ferruginous-pubescent like the calyx and buds. *Calyx-lobes* 4, 2 outer valvate; 2 inner valvate or imbricate, ovate, .2 to .25 in. long; all more or less recurved and ciliate at tip. *Corolla* tubular-campanulate, lobes and tube nearly equal, mouth of tube inside with a ring of soft ferruginous hairs; lobes oblong, ciliate at tip, sparsely hairy without, nerves spreading. *Stamens* 16, inserted above the ring of hairs in the mouth of the tube; filaments slender, .05 in. long, pubescent; anthers ovate-mucronate, tip ciliate, extrorse. *Ovary* ovoid; style curved, .3 in. long, stigma flat, minute. *Fruit* not seen.

PERAK: in rocky creeks on Gunong Batu at 1,500 to 2,000 feet, *King's Collector* 7411.

9. *BASSIA PERAKENSIS*, King & Gamble, n. sp. A tree reaching 60 to 80 feet in height and a considerable girth; branchlets thick, dark grey, prominently marked by the scars of fallen leaves and the tubercles on which the flower fascicles grew. *Leaves* coriaceous; oblong or obovate-oblong, shortly and abruptly acuminate at apex, acuminate narrowed at base; margins recurved, glabrous on both surfaces; 4 to 6 in. long, 1.5 to 2.5 in. broad; midrib stout, prominent; main-nerves slender, indistinct, 14 to 18 pairs, starting at an angle of 50° with the midrib, parallel, straight at first, arching near the margin to join in an intra-marginal looped nerve which is also met by the secondary nerves between the main ones; reticulations faintly marked on both surfaces; petiole .75 to 1 in. long, rather thick, bordered above by the decurrent

margins of the blade, swollen below. *Flowers* in fascicles of up to 10 to 12, on tubercles in the axils of the leaves or above the scars of fallen leaves on the previous year's wood; pedicels .5 to .6 in. long, slender, flattened below the flowers, densely pubescent at first, afterwards nearly glabrous, recurved in fruit; buds small, conical. *Calyx-lobes* 4, .2 in. long; 2 upper ovate-acute, densely pubescent, valvate; 2 lower imbricate, also densely pubescent, ciliate on the margins, somewhat keeled, ovate-acute. *Corolla* funnel-shaped; lobes 8, throat villous. *Stamens* about 16; filaments short glabrous; anthers sagittate. *Ovary* globose, villous, 8-celled, style .3 to .4 in. long, stigma minutely lobed. *Fruit* an ovoid densely pubescent berry about .7 to .9 in. in diam., crowned by the persistent style; seeds 1-2. *Seed* ovoid-oblong, .65 in. by .35 in., acute at base; testa shining, chestnut-brown, thin, crustaceous; hilum large, oblong; albumen none; cotyledons oblong, .45 in. long, .25 in. broad, radicle very small.

PERAK: *King's Collector* 512, 3846; *Curtis* 3695, on the Larút hill up to 2,500 feet.

10. *BASSIA ARGENTEA*, Clarke in Hook. f. Fl. Br. Ind. III. 545 (1882) (*not of de Vriese*). A large tree; branchlets rather thick, greyish-brown. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong, abruptly acuminate at apex, acute and often unequal at base; glabrous above, shining grey-silky beneath when young, nearly glabrous when old; 4 to 7 in. long, 2.5 to 3 in. broad; midrib prominent, thick; main-nerves 13 to 15 pairs, about .4 in. apart, starting at about 60° with the midrib, at first straight then curving upwards; reticulations many, very oblique; petiole 1 in. long, upper part bordered by the decurrent margin of the blade, swollen below and rugose. *Flowers* fascicled in clusters of 6 to 10 in the axils of the leaves, or above the scars of fallen leaves; pedicels slender, about .5 in. long, appressed-pubescent; buds conical. *Calyx-lobes* 4, outer and inner pairs both valvate; lobes ovate, .2 to .25 in. long, acute, pubescent. *Corolla* tubular-campanulate, tube .1 in. long; lobes 8 to 9, .15 in. long, linear-oblong. *Stamens* usually 24, in 3 rows, inserted on the top of the tube on a ring of rusty hairs; filaments very small or none; anthers ovate, densely hirsute, black-apiculate. *Ovary* rounded, depressed above, villous; style .2 to .3 in. long, villous half-way up, subulate; stigma capitate; cells 8 to 10. *Fruit* not seen.

MALACCA: *Maingay* (K.D.) 991, 1524; *Derry* 941.

*Bassia argentea*, de Vriese, seems to be a *Sideroxylon*, cf. Burck & Koord. & Val.

11. *BASSIA BRACEANA*, King & Gamble, n. sp. A tree with spreading branches, reaching 50 to 70 feet in height and 10 to 20 in. in diam.; branchlets pale brown. *Leaves* chartaceous; bright green, glossy,

oblong or elliptic-oblong, acuminate both at apex and at base; glabrous above, minutely pubescent on the nerves or in the axils of the nerves beneath; 4 to 8 in. long, 2 to 3 in. broad; midrib thick, impressed above; main-nerves 14 to 18 pairs, regular, parallel, conspicuous, about  $\cdot 4$  in. apart, starting at about  $60^\circ$  with the midrib, arching upwards to join near the margin; reticulations oblique, slender but conspicuous, joining the main-nerves more or less horizontally; petiole  $\cdot 8$  to  $1\cdot 4$  in. long, grooved above and bordered by the decurrent margins of the blade, thickened and somewhat curved below. *Flowers* fasciculate, usually 4 to 7 together, in the axils of the leaves, or above the scars of fallen leaves on the last year's wood below; pedicels  $\cdot 4$  to  $\cdot 6$  in. long, thickened above, otherwise slender, slightly pubescent. *Calyx-lobes* 4,  $\cdot 15$  to  $\cdot 25$  in. long; 2 outer opposite ovate rounded, enclosing the 2 inner concave rounded; sometimes ciliate on the margins, sometimes slightly emarginate, all more or less golden-pubescent without, enlarged after flowering. *Corolla* cream-coloured; tube cylindrical, short, about  $\cdot 1$  in. long only; lobes more or less spreading, 8 to 9, linear-oblong,  $\cdot 2$  in. long, slightly twisted. *Stamens* 16 to 18, in 2 rows, inserted on the top of the tube inside above a thick ring of tawny hairs; filaments very short; anthers ovate-lanceolate, strigosely hirsute, the connective ending in a long dark acumen. *Ovary* globose, glabrous; style  $\cdot 15$  in. long, stigmas very minute; cells about 8. *Fruit* an oblong green fleshy berry,  $\cdot 8$  to 1 in. long, crowned by the remains of the style; seed usually 1 only. *Seed* ovoid, flattened,  $\cdot 8$  in. long,  $\cdot 5$  in. broad, and  $\cdot 25$  in. thick; testa chestnut-brown, shining, crustaceous; hilum elongate, pale, conspicuous; albumen none; cotyledons thick,  $\cdot 5$  to  $\cdot 6$  in. long, ovoid, somewhat acute; radicle minute.

PENANG: *Curtis* 3063. PERAK: *King's Collector* 1846, 3195, 3275, 3740, 6447, 7584, 10412; *Scortechini* 314, 1483; *Wray* 1775, 2613, 2694.

VAR. *lanceolata*, King & Gamble. *Leaves* narrower, more lanceolate-acuminate; main-nerves closer. *Flowers* more numerous in the fascicles and fascicles more numerous on the last year's wood. *Corolla-lobes* often unequal in length, acute. *Anthers* with the acumen bifid.

PERAK: *Wray* 189, 1248, up to 3,400 feet.

13. *BASSIA LONGISTYLA*, King & Gamble, n. sp. A large tree, reaching 80 to 100 feet in height; branchlets thick, dark greyish-brown, innovations minutely pubescent. *Leaves* chartaceous; elliptic, shortly and rather abruptly acuminate at both apex and base; glabrous on both surfaces;  $3\cdot 5$  to 5 in. long,  $1\cdot 5$  to 2 in. broad; midrib slender; main-nerves 12 to 14 pairs, leaving the midrib almost at right

angles and curving upwards to meet near the margin; secondary nerves somewhat prominent as are the reticulations; petiole .6 to .8 in. long, slender, grooved above. *Flowers* fascicled, often up to 10 together, on tubercles above the scars of fallen leaves on the last year's wood; pedicels slender, glabrous, .5 to .7 in. long. *Calyx-lobes* 4, .15 to .2 in. long, ovate, somewhat acute, somewhat pubescent outside, the 2 outer enclosing the 2 inner. *Corolla* with very short (.05 in. long) cylindrical tube; lobes 8 to 9, rather spreading, oblong-lanceolate, obtuse or emarginate, prominently nerved, glabrous. *Stamens* 16 to 18, .2 in. long, inserted in 2 rows on the top of the tube above a short ring of tawny hairs; filaments .125 in. long, slender; anthers ovate, .075 in. long, apiculate, extrorse. *Ovary* cylindrical, style .5 in. long, surmounted by a minute rounded stigma. *Fruit* unknown.

PERAK: *King's Collector* 2680. SINGAPORE: *Ridley* 6498(?).

This species comes very near to *B. Braceana*, but the anthers differ so much that we hesitate to join them.

13. *BASSIA CUPREA*, King & Gamble, n. sp. A tree reaching 60 to 70 feet in height; branchlets thick, brown, uppermost somewhat angular. *Leaves* coriaceous; oblong, obtuse or emarginate at apex, attenuate at base and somewhat unequal; glabrous above, sparsely hairy on the nerves beneath, otherwise glabrous; 4.5 to 6 in. long, 2.5 to 3 in. broad; of a coppery-brown colour when dry; midrib very thick and prominent; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; reticulations visible but not strong; petiole thick, .75 to 1 in. long, bordered above by the decurrent margin of the blade. *Flowers* fasciculate in the axils of the leaves or of the scars of fallen leaves, 2 to 5 or more in a fascicle, fragrant; pedicels .5 in. long, pubescent; buds conical, .3 in. long. *Calyx-lobes* 4, .25 in. long; 2 outer valvate, broadly ovate, shortly pubescent; 2 inner rounded concave, shallowly emarginate, ciliate and scarious on the margins, pubescent without. *Corolla* .4 in. long; tube funnel-shaped, .1 in. long, mouth densely brown-hirsute; lobes 8-9, erect or spreading, .3 in. long, oblong, rounded at apex, long brown-silky-pubescent on back, strigosely hairy within. *Stamens* 18 to 22, inserted on the mouth of the tube; filaments hairy, .05 in. long; anthers ovate-acuminate, .15 in. long, the connective produced in a long usually curved acumen, strigosely hirsute. *Ovary* oblong, glabrous, 8-10-celled, ending in a style .5 in. long surmounted by a minutely 9-10-lobed flat stigma. *Fruit* not seen.

PERAK: *Scortechini* 1879.

This species comes near to *B. Motleyana*, Clarke, but the flowers are much larger and different.



14. *BASSIA MOTLEYANA*, Clarke in Hook. f. Fl. Br. Ind. III. 546 (1882). An erect lofty tree of swampy places; branchlets dark brown, marked by prominent leaf-scars. *Leaves* coriaceous; elliptic, shortly and abruptly acuminate at apex, cuneate at base, the two sides sometimes unequal; glabrous on both surfaces; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib prominent, raised above; main-nerves 10 to 12 pairs, irregularly spaced, generally at about an angle of 60° with the midrib, meeting near the margin in a looped intramarginal nerve; secondary nerves prominent, similar to the main-nerves, reticulations few; petiole ·8 to 1·2 in. long, rather thick, bordered by the decurrent margins of the blade. *Flowers* fascicled, many together (10 to 12), in the axils of the leaves or of the scars of fallen leaves below the terminal tuft, often fully clothing the branchlets for a distance of 6 in. or more; pedicels slender, ·4 to ·7 in. long, buds ovoid. *Calyx-lobes* 4, ·15 to ·2 in. long, ovate, obtuse or somewhat acute, sparsely pubescent, the inner pair somewhat scarious on the margins. *Corolla* campanulate, ·15 to ·2 in. long; tube short, about  $\frac{1}{3}$  of the whole; lobes 8, 4 outer enclosing 4 inner, oblong-spathulate, obtuse at tip and ciliate ferruginous-pubescent. *Stamens* 16, inserted on the top of the tube on a ring of long ferruginous hairs; filaments short, slender; anthers ovate-lanceolate, short-apiculate. *Ovary* rounded, villous, 6–8-celled; style ·5 in. long, thick, sparsely pubescent. *Fruit* an obovoid glabrous berry, acute at top and furnished with the remains of the persistent style; calyx-lobes also persistent; ·5 in. long, ·3 in. broad, 1–2-seeded. *Seeds* oblong, acute at both ends; testa crustaceous, shining; albumen none; cotyledons fleshy; radicle small. Burck in Ann. Jard. Buit. V. 44. *Isonandra Motleyana*, de Vriese in Miq. Journ. Bot. Neerl. I. (1861) 257.

MALACCA: Griffith (K.D.) 3608; Derry 1026. JOHORE: Ridley 6496. SINGAPORE: Ridley 5645, 5896.—DISTRIB. Borneo (*vide* Burck).

De Vriese says the milky juice gives a gutta of bad quality, being more waxy and fragile than that of other kinds.

VAR. *Scortechinii*, King & Gamble. *Leaves* much larger, 6 to 8 in. long, 2·5 to 3·5 in. broad, main-nerves 15 or 16 pairs. *Fruit* nearly globose—a dark green berry, shining when dry.

PERAK: *Scortechinii*, at Port Weld, No. 1550; King's Collector 5454, 6735, on low, wet ground—a tree reaching 60 to 80 feet in height and 15 to 20 in. in diam.

15. *BASSIA CUNEATA*, Bl. Bijdr. 675. A tree(?); branchlets dark brown, scarred, rather thick. *Leaves* coriaceous; clustered at the ends of the branchlets, greenish-brown when dry, obovate, obtuse-emarginate or very shortly and abruptly acute at apex, cuneate at base;

glabrous, margins slightly recurved; 4 to 5 in. long, 2 to 3 in. broad; midrib stout, prominent, impressed above; main-nerves not prominent, about 20 pairs, nearly at right angles to the midrib, anastomosing near the margin with the secondary nerves; reticulations transverse; petiole .6 to 1 in. long, bordered by the decurrent margins of the blade. *Flowers* in axillary fascicles as long as the petiole, not seen. *Fruit* a globose berry .75 to 1 in. in diam., 1-3-seeded. *Seeds* .5 to .7 in. long, .5 in. broad and thick, ovoid, not compressed, pointed at both ends; testa crustaceous, chestnut-brown, shining; hilum very broad (.4 in.); albumen none; cotyledons fleshy, semi-ellipsoidal. Miq. Fl. Ind. Bat. II. 1041; A. DC. Prod. VIII. 199; Clarke in Hook. f. Fl. Br. Ind. III. 546; Koord. & Val. Bijdr. I. 154.

MALACCA: *Maingay* (K.D.) 986. SINGAPORE: *Ridley* 6502.—  
DISTRIB. Java.

16. *BASSIA PENANGIANA*, King & Gamble, n. sp. A tree(?); branchlets dark grey. *Leaves* chartaceous; oblong-lanceolate, acutely attenuate at both ends; glabrous, greyish-green when dry; 5 to 7 in. long, 1.5 to 2.5 in. broad; midrib broad, conspicuous, impressed above and then keeled; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib and curved upwards to and along the margin; reticulations transverse, raised above; petiole 1 to 1.2 in. long, bordered by the decurrent margins of the blade, swollen at base; stipules very small, ovate, pubescent, caducous. *Flowers* in fascicles of about 5 to 6 in the axils of the leaves; pedicels slender, .4 to .5 in. long, appressed rusty-pubescent. *Calyx-lobes* 4, ovate, obtusely acuminate, recurved, .2 in. long, lower half thick, wrinkled, upper half thinner, somewhat scarious, sparsely appressed golden-pubescent. *Corolla* tubular-campanulate, .25 in. long; lobes 8 (?), oblong-spathulate, glabrous within, golden-pubescent without; tube rather shorter than lobes. *Stamens* 16 (?), inserted in a ring of hairs on the top of the tube; filaments slender; anthers linear-oblong, hirsute, the connective produced in a rather long, somewhat blunt, penicillate mucro. *Ovary* conical, glabrous; style slender, .3 in. long; cells 8.

PENANG: *Curtis* 1450.

17. *BASSIA ERYTHROPHYLLA*, King & Gamble, n. sp. A tree, 40 to 50 feet in height and 1 foot in diam.; branchlets thick, grey, marked with the scars of fallen leaves and the tubercles of fallen flowers. *Leaves* coriaceous: obovate-oblong, shortly and bluntly acuminate at apex, unequally attenuate at base; glabrous, orange-red when dry, margins slightly recurved; 6 to 8 in. long, 1.5 to 2.5 in. broad; midrib thick, prominent below, impressed above; main-nerves 10 to 12 pairs, rather irregular, starting at an angle of 60° from the midrib and

curved upwards to and along the margin; reticulations transverse, prominent, raised beneath; petiole 1·5 to 2 in. long, thickened at base, bordered above by the decurrent margins of the blade, younger ones golden-pubescent; stipules linear-subulate, ·3 to ·4 in. long, quickly caducous. *Flowers* fascicled, about 5 to 6 together, on raised tubercles above the scars of fallen leaves on year-old wood; pedicels in fruit thick, ·5 to ·6 in. long, golden-pubescent. *Calyx-lobes* 4, in fruit ovate-acute or rounded, densely golden-pubescent on both surfaces, thick; rest unknown. *Fruit* a globose, golden-pubescent, berry somewhat depressed at top and bearing the remains of the persistent style, ·5 to ·6 in. in diam. *Seed* not seen.

PENANG: at Highlands, *Curtis* 3652 (Kew) or 5652 (Calc.).

### 7. PALAQUIUM, Blanco.

Trees, often of great size and containing a milky juice. *Leaves* usually coriaceous, obovate or oblong, petioled, entire, sometimes covered beneath with a dense silky or tawny pubescence. *Flowers* fasciculate, in the axils of the leaves or of the scars of fallen leaves, pedicellate. *Calyx* of 6 lobes, the outer 3 valvate, the inner 3 imbricate. *Corolla* usually campanulate, tube short; lobes 6, imbricate, often contorted in bud. *Stamens* 12 or more (up to 18), opposite to and alternate with the corolla-lobes, those alternate often shorter and sometimes inserted higher up the tube; anthers ovate-lanceolate, dehiscence extrorse, connective produced; staminodes none. *Ovary* villous, 6-celled; style subulate. *Fruit* a fleshy, ovoid or ellipsoid, berry, 1–2-seeded. *Seeds* large, exalbuminous; the testa crustaceous; cotyledons thick, fleshy; radicle pointed, inferior.—DISTRIB. About 50 to 60 species, found in South India, Ceylon, Eastern Bengal, Burma, the Malay Peninsula and Archipelago, the Philippines, and Samoa (1 sp.). DICHOPSIS, Thw. in. Gen. Pl. II. 658.

Pedicels never over ·75 in. long, distributed for some distance down the upper branchlets:—

Leaves large, 5 to 12 in. long, obovate-obtuse; branchlets stout, nearly ·5 in. thick:—

Leaves nearly glabrous and glaucescent beneath, main-nerves distant, irregular .. .. .

1. *P. obovatum*.

Leaves ferruginous-pubescent or -tomentose beneath, main-nerves fairly close and regular:—

Leaves appressed-pubescent beneath, midrib glabrous on upper surface .. .. .

2. *P. Maingayi*.

Leaves spreading-tomentose beneath, midrib hairy on upper surface .. .. .

3. *P. Clarkeianum*.

Leaves rarely over 6 in. long, branchlets rarely ·25 in. thick:—

Leaves always more or less obovate:—

Leaves golden-silky-pubescent beneath :—

- Main-nerves close, over 20 pairs .. .. 4. *P. Gutta*.  
Main-nerves about  $\frac{1}{2}$  in. apart, under 20 pairs .. 5. *P. Oxleyanum*.

Leaves not or only very slightly silky-pubescent beneath :—

- Leaves conspicuously red or yellow when dry .. 6. *P. xanthochyllum*.  
Leaves not conspicuously red or yellow when dry,  
usually brown or greenish-brown :—  
Leaves over 3 in. long .. .. 7. *P. bancanum*.  
Leaves 2 to 3 in. long .. .. 8. *P. Ridleyi*.  
Leaves under 2 in. long .. .. 9. *P. microphyllum*.

Leaves elliptic, not obovate :—

- Produced connective of anthers bifid at point; leaves  
glabrous .. .. 10. *P. hexandrum*.  
Produced connective of anthers simple at point; leaves  
grey-pubescent beneath .. .. 11. *P. Herveyi*.

- Pedicels 1 in. long or longer, clustered only at the extreme ends  
of the branchlets; leaves oblong-lanceolate, 3-6 in. long .. 12. *P. stellatum*.

1. *PALAEQUIM OBOVATUM*, King & Gamble. A big tree with a foxy odour (Ridley), evergreen; the branches thick, brown, marked by the very prominent scars of fallen leaves; leaves clustered towards the ends of the branchlets; innovations rusty-pubescent. *Leaves* coriaceous; obovate-cuneate or obovate-oblong, obtuse or very shortly acute at apex, cuneate at base; recurved and somewhat undulate on the margins; glabrous above, glaucescent beneath; 5 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above, much raised beneath; main-nerves about 12 pairs, at an angle of  $40^{\circ}$  to  $45^{\circ}$  with the midrib, inconspicuous above, raised and prominent beneath; reticulations many, oblique, obscure; petiole thick,  $\frac{7}{8}$  to 1 in. long, bordered above by the decurrent margins of the blade, glabrescent or slightly rusty-pubescent. *Flowers* in clusters in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels 3 to 5 together,  $\frac{3}{4}$  to  $\frac{5}{8}$  in. long, rusty-pubescent; buds at first globose, afterwards elongate by the growth of the corolla. *Calyx-lobes* 6; outer 3 triangular-ovate, thick, pubescent outside,  $\frac{1}{5}$  in. long; inner 3 imbricate, ovate-obtuse,  $\frac{1}{8}$  in. long, margins scarious. *Corolla* campanulate; tube very short; lobes 6, imbricate and twisted,  $\frac{1}{4}$  to  $\frac{1}{2}$  in. long, glabrous without, slightly pubescent within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the lobes of the corolla, ovate lanceolate, apiculate, thickly rusty-villous; filaments as long as anthers, slender, glabrous. *Ovary* globose; style  $\frac{1}{2}$  in. long, subulate, glabrous. *Fruit* a globose berry,  $\frac{3}{4}$  to 1 in. in diam., pulp fleshy, seeds 1 to 2. *Seed* ovoid, scarcely flattened on one side, pointed at base; testa thin, shining; albumen none, cotyledons fleshy. *Dichopsis obovata*, Clarke in Hook. f. Fl. Br. Ind. iii. 542. *Isonandra obovata*, Griff. Notul. iv. 293; Kurz

For. Fl. II. 120 and Journ. As. Soc. Beng. XLVI. ii. 230. *Bassia?*  
*hypoleuca*, Miq. Fl. Ind. Bat. Suppl. 582 (*fide Kurz*).

PENANG: *Holmberg* 783. MALACCA: *Griffith* (K.D.) 3606; *Maingay*  
(K.D.) 985, 996; *Curtis* 3480, 3481, 3482; *Hervey* 2754; *Derry* 59, 88;  
*Ridley* 10079; *Goodenough* 1994. SINGAPORE: *T. Anderson* 122; *Ridley*.

—DISTRIB. Tenasserim, Sumatra.

Curtis says it gives a low class bastard gutta of little value. Vern. "Niato bunga"  
"Niato tunbaga" "Niato balam."

2. *PALAQUIUM MAINGAYI*, King & Gamble. A tree; stems reach-  
ing 60 feet in height and 10 to 15 in. in diam.; branchlets dark  
brown, rough, about .4 in. in diam., marked by the large scars of fallen  
leaves; innovations densely short-rusty-pubescent. *Leaves* charta-  
ceous; obovate, obtuse at apex, cuneate or slightly rounded and more or  
less auricled at base; margins recurved; glabrous above except on  
midrib, thickly ferruginous-pubescent beneath; 5 to 13 in. long, 3 to  
7 in. broad; midrib stout, impressed above, prominent beneath, main-  
nerves 12 to 20 pairs, .5 to .8 in. apart, starting at an angle of about 55°  
with the midrib, parallel to near the margin and then curving upwards  
to join in a marginal nerve; reticulations not prominent, obliquely join-  
ing the main-nerves; petiole 1 to 1.5 in. long, thickly rusty-pubescent,  
channelled above by the decurrent margins of the blade; stipules  
subulate falcate, .5 in. long, very caducous. *Flowers* fasciculate, up to  
10 together, in the axils of the leaves or of the scars of fallen leaves;  
pedicels .5 to .7 in. long, rusty-pubescent. *Calyx-lobes* 6; outer 3 valvate,  
ovate, densely pubescent, .15 in. long; inner 3 imbricate, orbicular,  
depressed at top, scarious and ciliate on the margins, .15 in. long.  
*Corolla* campanulate; tube short (.1 in.); lobes 6, imbricate, overlapping  
to the right, ovate-oblong, glabrous, .25 to .35 in. long. *Stamens* 12,  
.25 in. long, opposite to and alternate with corolla-lobes; anthers ovate,  
apiculate, slightly rusty-hirsute behind; filaments as long as anthers,  
slender. *Ovary* rounded; style .2 to .4 in. long, subulate; cells 6. *Fruit*  
a shining, green, fleshy berry, about .5 in. long, supported by the per-  
sistent calyx. *Seeds* 2, oblong; testa dark brown, crustaceous; albumen  
none. *Dichopsis Maingayi*, Clarke in Hook. f. Fl. Br. Ind. III. 543.

PERAK: *Wray* 524, 553, 2215, up to 2,000 feet; *King's Collector* 6644.  
MALACCA: *Maingay* (K.D.) 996/2; *Hervey*.

*P. Ottolanderi*, Koord. & Val. of Java is near this species, but is readily dis-  
tinguished by its larger flowers and long pointed fruit.

3. *PALAQUIUM CLARKEANUM*, King & Gamble. A large tree, with  
thick rough bark and spreading branches, reaching 100 to 150 feet in

height and 2 to 4 feet in diam. of stem; branchlets stout, uppermost .5 in. in diam., prominently pitted with the scars of fallen leaves, densely ferruginous-tomentose. *Leaves* chartaceous; obovate, obtuse at apex, cuneate at base; glabrous above except on the midrib which is strongly pubescent, densely ferruginous-tomentose beneath; margins recurved; 8 to 10 in. long, 4 to 5 in. broad; midrib very thick; main-nerves 18 to 22 pairs, rather irregular, starting at about 70° to 80° with the midrib, straight at first then arching at and along the margin, impressed above; reticulations obliquely transverse, prominent; petiole .7 to 1 in. long, thick, densely ferruginous-tomentose, enlarged at base. *Flowers* not seen. *Fruit* an oblong, glossy, bright green berry, 2 in. long, 1-seeded. *Seed* oblong, acute at both ends, rounded on the back, flattened at the hilum, 1.2 in. long, .5 in. broad; testa thin, chartaceous, shining, chestnut-brown; hilum oblong; cotyledons oblong, fleshy. *Dichopsis Clarkeana*, Brace MS. in Herb. Calc.

PERAK: at Waterfall Hill, 600 feet, Wray 530; on open hills near Larut at 500 to 1,000 feet, King's Collector 3796.

Wray says the gutta it gives is not enough in quantity to be worth extraction. The tree is evidently closely allied to *P. Maingayi*, and might almost be made a variety of that species.

24. *PALAEQUIM GUTTA*, Burck in Ann. Jard. Buit. V. 24, t. IV. (1885). A large evergreen tree; branchlets rough, prominently marked with the scars of fallen leaves and with longitudinal wrinkles; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; obovate or obovate-oblong, abruptly and usually shortly acuminate at apex rarely rounded, cuneate at base; margins slightly recurved; glabrous above, densely appressed-golden-silky-pubescent beneath especially when young, when old glabrescent; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 24 to 30 pairs, indistinct, starting at rather more than 60° with the midrib, parallel and arching only close to the margin; secondary nerves and reticulations inconspicuous, the latter very oblique; petiole 1 to 1.5 in. long, slender, grooved above, slightly thickened at base, appressed-golden-pubescent. *Flowers* in fascicles of about 4 to 5, in the axils of the leaves or of the scars of fallen leaves on the previous year's wood; pedicels thick, .1 to .2 in. long, somewhat angular, densely golden-pubescent. *Calyx-lobes* 6; 3 outer valvate, triangular-ovate, .3 in. long; 3 inner imbricate, rather longer and more acute, golden-pubescent without. *Corolla* rotate-campanulate; tube shorter than the calyx; lobes 6, ovate, obtuse, imbricate and twisted at first, afterwards spreading, .25 in. long, glabrous. *Stamens* 12, opposite to

and alternate with the corolla-lobes, inserted at the top of the tube; filaments equal, slender, 1 in. long; anthers shorter than the filaments, ovate, extrorse, the connective produced in a broad point. *Ovary* sub-globose, slightly pubescent, 6-celled; ovules oblong, one in each cell; style .4 to .5 in. long, filiform; stigma obtuse. *Fruit* a 1-2-seeded berry, .6 to .7 in. in diam., ovoid, acute at top; pulp very glutinous, hard. *Seeds* oblong, rounded at the ends; hilum very large, elliptic, occupying about one-half of the surface; testa shining. Pierre in Bull. Soc. Linn. Par. I. 498; Engl. & Prantl Pflanzenfam. IV. i. 135, fig. 71; Baill. Hist. des Pl. XI. fig. 296. *Dichopsis Gutta*, Benth. in Gen. Pl. II. 658; Clarke in Hook. f. Fl. Br. Ind. III. 543. *Isonandra Gutta*, Hook. Lond. Journ. Bot. VI. 463 t. 16; Walp. Ann. i. 496; Miq. Fl. Ind. Bat. II. 1038 t. XXXVI.; Benth. & Trim. Med. Pl. t. 167.

PENANG: *Curtis* 780, 3535, 3582, 3633, 3635. PERAK: *Wray* 522. MALACCA: *Maingay* (K.D.) 983. DINDINGS: *Hallifax* (*Curtis* 3639). SINGAPORE: *Lobb* 290; *Ridley* 9519, 11320.

The true guttapercha tree, perhaps the most valuable of all the trees of the Peninsula. It gives the "Taban" Gutta or "Taban Merah." It has become very scarce in a wild state, but is now being much planted, so perhaps it may soon again become common (see also H. C. Hill, Reports on Forest Conservancy in the Straits Settlements and the Federated Malay States, and Burn-Murdoch in "Indian Forester," XXXI. 309, "Some Facts about Gutta Percha.") *Ridley*, in Trans. Linn. Soc. III. (1893), 317, says the tree was seen by him in several places in the Tahan woods, and that a considerable amount of guttapercha is collected there.

VAR. *oblongifolia*. A large tree; stem reaching 80 feet in height and up to 2 feet in diam. *Leaves* larger than in the typical form, obovate-oblong or lanceolate-oblong; longer, abruptly acuminate, reaching 7 in. in length and 3 in. in breadth, rather more conspicuously golden-pubescent. *Flowers* similar but a little larger, pedicels a little shorter. *Fruit* rather larger, less acute at top. *P. oblongifolium*, Burck in Ann. Jard. Bot. Buit. V. 25 tab. V. *Isonandra Gutta* var. *oblongifolia*, de Vriese, Tuinbouw Flora (1856), III. 226. *Isonandra Gutta*, var.  $\beta$ . *sumatrana*, Miq. Fl. Ind. Bat. II. 1038, and Suppl. 581.

PERAK: *Curtis* 3637, 3725; *Wray* 535; *Murton*; *King's Collector* 6475. JOHORE: *Curtis* 3632—in open forest in the hills at 500 to 1,000 feet.—DISTRIB. Sumatra, Borneo. Gives guttapercha like the type.

We are unable to find sufficient characters for separating this, as a species, from *P. Gutta*, as is done by Burck. The specimens available seem to point to a regular series of intermediates, so that it can scarcely be even maintained as a variety. It is possible that *P. malaccense* and *P. formosum*, Pierre in Bull. Soc. Linn. Par. I. 498, are both forms of *P. Gutta*, but we have seen no specimens. Beccari in "Nelle

Foreste di Borneo," p. 558, suggests the identity of the latter species with *P. oblongifolium*.

5. *PALAEQUIM OXLEYANUM*, Pierre in Bull. Soc. Linn. Par. I. 498 (1885), *non* Burck. A large tree; branchlets dark brown, marked by prominent scars of fallen leaves; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; oblong-obovate, abruptly and shortly acuminate at apex, cuneately attenuate at base; glabrous above, densely appressed-golden-pubescent beneath, finally glabrate, margins recurved; 5 to 8 in. long, 2.5 to 3 in. broad; midrib prominent, thick, impressed above; main-nerves 14 to 18 pairs, irregular, sometimes branched, .4 to .5 in. apart, starting at an angle of about 60° with the midrib, curved near the margin to meet in a rather faint looped intramarginal nerve; secondary nerves few; reticulations few, horizontally transverse; petiole 1 to 1.5 in. long, somewhat thickened at base, minutely rusty-pubescent, channelled above and bordered for some distance by the decurrent margins of the blade; stipules minute, falcate, caducous. *Calyx-lobes* 6; 3 outer rather thicker than 3 inner, ovate, sub-acute, densely ferruginous-pubescent, .25 in. long. *Fruit* a nearly globose berry, 1 in. long and about .75 in. in diam. *Seeds* oblong; testa shining, crustaceous. *Dichopsis pustulata*, Hemsl. in *Herb. Kew*.

PENANG: *Curtis* 3582. PERAK: *Curtis* 3631, 3638, 3724—on the hills up to 2,500 feet; *Wray* 511 (*part*), 590; *Douglas*; *Phillips*. SELANGOR: *Curtis* 3763, 3764. SINGAPORE: *Maingay* (K.D.) 983 (the No. 1948 quoted by Pierre); *Jas. Collins* (a pustulate form apparently diseased).

This species gives apparently the "taban sutra" or "taban putih" guttapercha, which is not one of the best quality.

VAR. *glabrata* King & Gamble. *Leaves* smaller, about 1.5 in. broad, glabrate beneath, rarely slightly golden-pubescent; *fruit* oblong; *branchlets* grey, very rough with scars of fallen leaves and flowers.

PERAK: *Wray* 511 (*part*), 518.

*P. Oxleyanum*, Burck Ann. Jard. Buit. v. (1886) 33, is a different plant altogether (see *Teysmann's* specimen in *Herb. Kew*).

6. *PALAEQUIM XANTHOCHYUM*, Pierre ex Burck in Ann. Jard. Buit. V. 30 (1885). A large handsome tree; the stem reaching 80 to 120 feet in height and 2.5 to 3 feet in diam.; branchlets dark brown, innovations rusty-pubescent; leaf-bud scales lanceolate, ciliate, about .1 in. long. *Leaves* coriaceous, glossy-green; obovate, obtuse and often emarginate at apex, cuneate at base; glabrous on both surfaces, margin recurved, reddish when dry; 2.5 to 4 in. long, 1.5 in. broad; midrib prominent,



impressed above; main-nerves obscure, about 12 to 14 pairs at about 60° with the midrib; reticulations scarcely visible; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade; stipules ovate, ciliate, very small, caducous. *Flowers* fascicled, up to 8 together, in the axils of the leaves or of the scars below them; pedicels slender, recurved, .2 in. long; buds very small, conical. *Calyx-lobes* 6, .1 in. long; 3 outer valvate, 3 inner imbricate, ovate-acute, rusty-pubescent. *Corolla* campanulate, .3 in. long, tube short; lobes 6, imbricate, oblong, blunt. *Stamens* 12, inserted on the top of the tube; filaments stout, curved; anthers ovate-sagittate, mucronate, extrorse. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Fruit* an ovoid berry, glabrous. *Isonandra xanthochyma*, de Vriese Nat. Tijdschr. Ned. Ind. XXI. 311, and Miq. Journ. Bot. Neerl. i. 259. *Dichopsis rubens*, Clarke in Hook. f. Fl. Br. Ind. III. 543.

PERAK: *King's Collector* 7288—on low ground and rich soil. MALACCA: *Maingay* (K.D.) 995. SINGAPORE: *Cantley* 63; *Ridley* 3774. —DISTRIB. Borneo.

Produces a guttapercha of a yellowish colour and second quality (de Vriese).

7. *PALAEQUIM BANCANUM*, Burck in Ann. Jard. Buit. V. 43 (1885). A very large evergreen tree; stems reaching 80 to 100 feet (Curtis), 100 to 120 feet (Kunstler) in height, with a girth of 10 to 12 feet; branchlets rough, prominently marked with the scars of fallen leaves, upper branchlets and innovations slightly but minutely rusty-pubescent. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or obovate-oblong, abruptly and very shortly acute at the otherwise rounded apex, cuneate at base; margins slightly recurved; glabrous on both surfaces, the lower with very minute glandular scales; 3 to 4 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves very obscure, about 14 to 16 pairs, inclined at nearly 70° to midrib and at first parallel, afterwards arching, reticulations very faint; petiole .7 to 1 in. long, edged above with the decurrent margins of the blade, glabrous. *Flowers* fasciculate, clustered about 2 to 4 together in the axils of the leaves or of the scars of fallen leaves, often on a length of as much as 4 to 5 in. of the branchlet; pedicels and calyx minutely ferruginous-pubescent; pedicels .1 to .15 in. long, thick. *Calyx-lobes* 6, the 3 outer valvate rounded, the 3 inner imbricate acute, .15 to .2 in. long. *Corolla* campanulate, tube as long as calyx; lobes 6, ovate, spreading, as long as tube, glabrous except a slight rusty pubescence within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the corolla-lobes; filaments inserted on the top of the tube, slender; anthers ovate, apiculate, extrorse. *Ovary* flattened-

cylindrical, the top rusty-hirsute; style as long as corolla, subulate, glabrous; cells 6. *Fruit* a fleshy oblong or obovate berry, smooth, .75 in. long, .5 in. thick, 1-seeded.

PENANG: *Curtis* 3583, 3659. PERAK: *Wray* 3984; *King's Collector* 6506, 6509. SINGAPORE: *Ridley* 6019, 6134, 6502, 6507; *Fox* 11307 at Bukit Timah; *Cantley* 73.—DISTRIB. Bangka.

Said to give a kind of "guttapercha."

8. *PALAEQUIM RIDLEYI*, King & Gamble, n. sp. A tree (?); branchlets blackish-grey, rough, innovations minutely rusty-pubescent. *Leaves* chartaceous-coriaceous; elliptic or elliptic-obovate, obtuse, emarginate or slightly acute at apex, cuneate at base; glabrous on both surfaces, margins slightly recurved; 2 to 3 in. long, 1 to 2 in. broad; midrib broad; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin, .2 to .3 in. apart; reticulations many, transverse, impressed above; petiole .5 to .7 in. long flattened and bordered by the decurrent broad margins of the blade; stipules small, ovate, hirsute, caducous. *Flowers* small, fascicled in groups of 6 or 7 together in the axils of the uppermost leaves; pedicels rather thick, about .25 in. long, sparsely appressed-pubescent. *Calyx-lobes* 6, .1 in. long; 3 outer rounded, shortly mucronate, glabrous, wrinkled when dry; 3 inner thin, scarious on the margins, ciliate, rusty-pubescent on both sides. *Corolla* tubular-campanulate, .15 in. long, glabrous; lobes 6, oblong, obtuse, erose at tip; tube as long as lobes. *Stamens* 12, inserted on the top of the tube opposite to and alternate with the lobes; filaments slender as long as the lobes; anthers ovate-acute. *Ovary* conical, glabrous below, villous above, surmounted by a conical thick style, .05 in. long, 6-celled. *Fruit* not seen.

SINGAPORE: *Ridley* 3591A.

9. *PALAEQUIM MICROPHYLLUM*, King & Gamble, n. sp. A tree (?); branchlets rounded, rough, dotted with scars of fallen leaves and flowers; innovations dark ferruginous-pubescent. *Leaves* coriaceous; obovate, obtuse or slightly obtusely-acute at apex, cuneate at base; glabrous on both surfaces, margins recurved; 1 to 2 in. long, .7 to 1 in. broad; midrib slender, impressed above; main-nerves indistinct, about 8 to 10 pairs, nearly at right angles to the midrib; reticulations very faint even when dry; petiole .4 to .5 in. long, bordered above by the decurrent margins of the blade. *Flowers* fascicled, 1 to 3 together, above the scars of fallen leaves on the past year's wood; pedicels .2 in. long, rusty-pubescent. *Calyx-lobes* 6; outer 3 valvate, ovate-acute, .15 to .2 in. long, densely tawny-pubescent; inner 3 imbricate, ovate,

blunt, scarious and ciliate on the margins, tawny-pubescent on the back, .1 to .15 in. long. *Corolla* tubular-rotate; the tube very short, scarcely .05 in. long; the 6 lobes oblong or nearly spatulate, .1 to .15 in. long, reflexed in flower, sparsely hairy without. *Stamens* 12, filaments slender, recurved; anthers ovate, .075 in. long, bi-mucronate. *Ovary* tawny-villous, conical; style .15 to .2 in. long, straight; cells 6. *Fruit* not seen.

SINGAPORE: at Bukit Timah, *Ridley* 10840.

10. *PALAEQUIM HEXANDRUM*, King & Gamble. A tree; branchlets light brown, innovations ferruginous-pubescent. *Leaves* chartaceous, glabrous; elliptic-oblong, shortly and bluntly acute at apex, attenuate and more or less unequal at base; 4 to 5 in. long, 2 to 2.5 in. broad; midrib thick, prominent; main-nerves 10 to 13 pairs, starting at about 65° to midrib then arched upwards, reticulations obscure. *Flowers* fasciculate, 3 to 4 together in the axils of the leaves or the scars of fallen leaves; pedicels slender, .4 in. long, minutely pubescent. *Calyx-lobes* 6; 3 outer valvate, 3 inner more or less imbricate, pubescent outside, ciliate, .05 to .07 in. long, apex scarcely acute. *Corolla* campanulate; tube .1 in. with a ring of hairs near the mouth inside; lobes 6, imbricate, .15 in. long, oblong obtuse, spreading. *Stamens* 12, inserted on the top of the tube, 6 opposite to and 6 alternate with the lobes, the alternate ones shorter; filaments slender; anthers exsert, ovate-lanceolate, bi-mucronate, as long as filaments. *Ovary* rounded, thickly rusty-pubescent; style subulate, .25 in. long. *Fruit* a fleshy berry, about .75 in. in diam., smooth, 1-seeded. *Seed* ovoid, .7 in. long, .5 in. broad, scarcely flattened; testa thin, brown, shining; hilum very large, occupying about one-half of the seed; albumen none. *Dichopsis hexandra*, Clarke in Hook. f. Fl. Br. Ind. iii. 543. *Isonandra hexandra*, Griff. Notul. IV. 292. *Payena Griffithii*, Kurz For. Fl. II. 121, and Journ. As. Soc. Beng. XLVI. ii. 230 (*vide* Clarke, but with doubt).

MALACCA: *Griffith* (K.D.) 3609; *Maingay* (K.D.) 984. SINGAPORE: *Ridley* 11373.—DISTRIB. Burma (?)

11. *PALAEQUIM HERVEYI*, King & Gamble, n. sp. A large tree; branchlets rather stout, dark brown; innovations minutely rusty-pubescent; leaf-bud scales lanceolate, .15 in. *Leaves* chartaceo-coriaceous; elliptic or elliptic-obovate, very shortly acute or sometimes emarginate at apex, cuneately attenuate often unequally at base; glabrous above except on midrib and nerves, sparsely rusty-pubescent beneath, afterwards glabrate, cinereous when dry; 2 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent; main-nerves 5 to 7 pairs at about 45° with the midrib and arching upwards, reticulations obscure; petiole .5 in. long

bordered above by the decurrent margins of the blade, rusty-pubescent. *Flowers* small, fascicled 4 to 6 together in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels .3 in. long, slender, decurved, pubescent; buds very small, globose. *Calyx* 6-lobed, 3 outer valvate, and 3 inner imbricate, .1 in. long, lobes ovate acute, pubescent. *Corolla* campanulate; tube short, rusty-hirsute without; lobes 6, oblong-linear, recurved in flower, hairy within at the base, .15 in. long, imbricate. *Stamens* 12; filaments long, exsert; anthers ovate, mucronate, extrorse, as long as filaments, hirsute. *Ovary* subglobose, rusty-pubescent, 6-celled; style slender, .3 in. long; stigma capitate. *Fruit* not seen.

PERAK: Wray 1104. MALACCA: Maingay (K.D.) 995; Scortechini 1892; Hervey. Vern. "Jongek" (Hervey).

Wray says the gutta is sticky and worthless.

12. *PALAQUIUM STELLATUM*, King & Gamble. A large tree, stems reaching over 100 feet in height; branchlets rather thick, dark brown, rough with the scars of fallen leaves; innovations ferruginous-pubescent. *Leaves* membrano-chartaceous, clustered at the ends of the branchlets; oblong-lanceolate, shortly acuminate at apex, cuneate at base; nearly glabrous above, pale and when young tomentose beneath, rusty-stellate-tomentose (Scortechini) on the nerves on both sides; 3 to 6 in. long, 1 to 1.5 in. broad; midrib prominent; main-nerves 10 pairs, starting at about 60° with the midrib and at once curving upwards; reticulations prominent on both sides in an elegant network; petiole .75 to 1 in. long, slender, densely rusty-pubescent. *Flowers* fasciculate, 3 to 5 together in the axils of the upper leaves, forming almost a terminal leafy corymb of about 20 to 25 flowers; pedicels slender, about 1 in. long, densely rusty-pubescent. *Calyx-lobes* 6, densely rusty-pubescent, in 2 series; the outer of 3 valvate, ovate, rounded lobes, the inner of 3 ovate ciliate lobes with scarious margins; both .25 to .3 in. long. *Corolla* campanulate, .3 to .4 in. long, the tube a little shorter than the lobes; the lobes imbricate, twisted in bud, rounded at top, glabrous. *Stamens* 12 in one series; filaments on the base of the tube and attached to it, free above, .2 in. long, thickened below, slender above; anthers oblong-lanceolate, apiculate, extrorse, .1 in. long, glabrous. *Ovary* rusty-pubescent, sub-globose; style slender, .35 in. long; cells 6 (?). *Fruit* not seen. *Dichopsis stellata*, Scortechini MS. in Herb. Calc.

PERAK: Scortechini, 1855.

A very distinct species, looking very like a *Bassia*. Scortechini says it yields good gutta, but in small quantities.

8. *MIMUSOPS*, Linn.

Trees with milky juice. *Leaves* chartaceous or coriaceous, with many usually inconspicuous parallel main-nerves. *Flowers* solitary or fascicled in the axils of the upper leaves on the branchlets. *Calyx-lobes* 6 or 8, in 2 series, the outer valvate enclosing the inner imbricate. *Corolla* with short tube; lobes 18 or 24 or more in 2 rows, one-third of the number in the inner, the rest in the outer, row; lobes of the outer row often divided.\* *Stamens* 6 or 8, attached to the corolla-tube opposite the inner lobes; filaments short, dilated, free or connate in a tube with the staminodes; anthers lanceolate, extrorse, usually apiculate by the production of the connective. *Staminodes* alternate with and as many as the stamens, sub-petaloid, usually fimbriate. *Ovary* hirsute, 6-8-celled. *Fruit* a globose or ovate fleshy berry, epicarp crustaceous; seeds few or solitary. *Seeds* ovate or oblong, often oblique, slightly compressed; hilum basal or lateral; testa hard, shining; albumen fleshy, thin; cotyledons flat, leafy.—*DISTRIB.* Species about 30; in the tropics of both hemispheres.

<i>Calyx</i> -segments 8; <i>stamens</i> 8; <i>staminodes</i> acuminate, hairy	.. 1. <i>M. Elengi</i> .
<i>Calyx</i> -segments 6; <i>stamens</i> 6; <i>staminodes</i> fimbriate, glabrous	.. 2. <i>M. Kauki</i> .

1. *MIMUSOPS* *ELENGI*, Linn. Sp. Pl. 349 (1753). An evergreen tree, stems reaching 40 to 50 feet in height, and with a large girth; ultimate branchlets with dark brown rusty pubescence. *Leaves* chartaceous; elliptic, shortly acuminate at apex, rounded (often unequally), at base; glabrous on both surfaces, shining above; margins slightly recurved; 3 to 5 in. long, 1·5 to 2·5 in. broad; midrib prominent, raised on both surfaces; main-nerves numerous, the first pair from the base forming intra-marginal nerves, which are looped where they meet the 14 to 16 pairs of main-nerves; secondary nerves like the main-nerves and, with the reticulations, forming an elegant network; petiole ·6 to 1 in. long, slender; stipules triangular-subulate, very small, ferruginous-pubescent, very caducous. *Flowers* white, fragrant, solitary or in fascicles of 2 to 6 in the axils of the upper leaves; pedicels ·3 to ·7 in. long, often deflexed, appressed-ferruginous-pubescent; buds ovoid, acute. *Calyx-lobes* 8, ·3 in. long, ovate-lanceolate, acuminate; the 4 outer valvate, broader than the 4 inner imbricate and channelled on the back; all rusty-pubescent without, glabrous within. *Corolla* with a very short tube, scarcely over ·05 in. long; lobes 24, in 2 rows, the 16 outer linear-lanceolate, the 8 inner rather broader and shorter, linear-oblong. *Stamens* 8,

\* The outer corolla-lobes are now usually considered to be of the character of stipules to the inner row which constitute the regular petals.

opposite the lobes of the inner row; filaments slender, .05 in. long; anthers oblong, glabrous, apiculate. *Staminodes* alternate with the anthers, oblong-lanceolate, acuminate, toothed, clothed on the back and sides with pale stiff hairs. *Ovary* silky-pubescent, 6-celled; style slender, grooved, as long as corolla. *Fruit* an ovoid berry about 1 in. long; yellow when ripe, 1- rarely 2-seeded. *Seed* oblong, .75 in. long, .5 broad and about .25 thick, rounded above, hollowed at base where is the small oval hilum; testa crustaceous, dark brown, shining; albumen thin; cotyledons oblong, leafy, nearly as large as the seed cavity; radicle inferior. Roxb. Cor. Pl. I. 15. t. 14, and Fl. Ind. II. 236; Gaertn. f. Fruct. I. 198, t. 42; Lamk. Ill. t. 300; Baillon Hist. Pl. XI. 267, figs. 302-309; Engl. & Prantl Pflanzenfam. IV. i. 152, fig. 82 E-J; Burck Ann. Jard. Buit. V. (1886) 61; Wall. Cat. 4146; A. DC. Prod. VIII. 202; Clarke in Hook. f. Fl. Br. Ind. III. 548; Dalz. & Gibs. Bomb. Fl. 140; Wight Ic. t. 1586; Brandis For. Fl. 293; Bedd. Fl. Sylv. t. 40; Kurz in Journ. As. Soc. Beng. XLVI. ii. 231, For. Fl. II. 123; Trimen Fl. Ceyl. III. 86; Prain Beng. Pl. 649; Cooke Fl. Bomb. II. 95. *M. obtusifolia*, Bl. Bijdr. 672. "*Elengi*" Rheede Hort. Mal. I. 33 t. 20. Rumph. Herb. Amb. II. 189 t. 63.

PERAK: *Scortechini* 1122. MALACCA: *Griffith* (K.D.) 3612; *Maingay* (K.D.) 995/2, 998; *Cuming* 2265.—DISTRIB. India, Ceylon, Burma, cultivated in other tropical regions; the fallen corollas are used to make garlands.

2. *MIMUSOPS KAUKI*, Linn. Sp. Pl. 349 (1753). A large evergreen tree; branchlets thick greyish-brown, extremities somewhat ferruginous-scaly or -pubescent. *Leaves* coriaceous, clustered towards the ends of the branchlets; obovate or elliptic-obovate, obtuse, emarginate or very slightly acute at apex, cuneate at base; glabrous above, densely and smoothly grey-silky-pubescent beneath; the margins slightly recurved; 2 to 4 in. long, 1.25 to 2.75 in. broad; midrib prominent; main-nerves very indistinct, about 14 to 16 pairs, parallel, meeting near the edge in a looped intramarginal nerve; petiole .5 to 1.5 in. long, moderately thick, channelled above. *Flowers* thickly clustered towards the ends of the branchlets; pedicels .75 to 1 in. long, appressed grey-silky-pubescent, angular. *Calyx-lobes* 6, .25 in. long; 3 outer valvate, ovate, acute, grey-silky-pubescent; 3 inner imbricate, similar but rather thinner. *Corolla* with a very short tube and 18 (or more, exceptionally) lobes in 2 rows; the outer row 12, lanceolate, acute; the inner 6, spatulate; all .1 in. long or nearly so, glabrous. *Stamens* 6 to 8, usually 6, extrorse; filaments .1 in. long, conical, glabrous; anthers .1 in. long, linear, blunt. *Staminodes* alternating with the stamens, .2 to .25 in. long, cuneate, deeply and irregularly fimbriate at apex.

Ovary villous, ovoid, 6-celled; ovules elliptic; style exsert, .4 in. long, slender. *Fruit* an ovoid rough berry, .1 in. long, 2-4-seeded. *Seeds* obliquely obovoid, somewhat curved near the base, .6 to .7 in. long by .4 to .5 in. broad and .4 in. thick; hilum lateral towards the base, .35 in. long, linear-oblong; testa thick, crustaceous, chestnut-brown; albumen thin; cotyledons flat, leafy, oblong, .3 to .35 in. long; radicle inferior, rather large. Wall. Cat. 4149E (*upper half*); A. DC. Prod. VIII. 203; Clarke in Hook. f. Fl. Br. Ind. III. 549; Miq. Fl. Ind. Bat. II. 1042; Koord. & Val. Bijdr. I. 156; Burek in Ann. Jard. Buit. V. (1886) 64. *M. Balata*, Gaertn. f. Fruct. III. 133. *M. Balota*, Bl. Bijdr. 673. *M. Hookeri*, A. DC. Prod. VIII. 204. *M. Bojeri*, A. DC. l.c. 205 (*fide Miquel*). *M. dissecta*, R. Br. Prod. 531. *M. Browniana*, Benth. Fl. Austral. IV. 285.—Rumph. Herb. Amb. iii. 19. t. 8 *flor. exc.*

PERAK: *Scortechini*. MALACCA: *Griffith* (K.D.) 3614; *Maingay* (K.D.) 987.—DISTRIB. Amherst in Burma, *Wallich*; Malay Islands; tropical Australia—cultivated elsewhere for its edible fruit.

The following new species from the Andaman Islands seems worthy of description here.

MIMUSOPS ANDAMANENSIS, King & Gamble, n. sp. A tree (?); branchlets slender, grey; innovations, with inflorescence and leaf-petioles, covered with appressed pale tawny tomentum. *Leaves* coriaceous; elliptic-obovate, shortly acute at apex, cuneate at base; margins recurved; glabrous on both surfaces; 3 to 4 in. long, 2 to 3 in. broad; midrib slender; main-nerves about 15 pairs, parallel, very inconspicuous, secondary nerves similar to main-nerves, less prominent; petiole slender, .75 to 1 in. long, channelled above. *Inflorescence* of 1-3-flowered sessile umbels in the axils of the upper leaves; pedicels slender, .8 to 1 in. long, angular; buds ovoid-conical, .4 in. long. *Calyx-lobes* 8 in 2 series; outer 4 lanceolate, acuminate, valvate, reflexed when open, .4 to .5 in. long; inner 4 as long, linear-lanceolate, deeply channelled on the back, scarcely imbricate. *Corolla-lobes* 24, the inner series of 8, oblong-lanceolate, glabrous, obtuse, each bearing behind it two narrow acute, simple or deeply bifid lobes, rather shorter than and narrower than the 8 inner lobes. *Stamens* 8, opposite the inner corolla-lobes, and shorter than them; filaments slender, slightly hirsute, .075 in. long; anthers linear-sagittate, the connective produced in a long apiculus, often bifid. *Staminodes* alternate with the stamens and rather shorter than them, densely hirsute, linear-lanceolate, long acuminate, midrib black. *Ovary* rounded, 8-lobed, pubescent; style subulate, glabrous, stigma minutely cleft; cells 8, each with a narrow central ovule. *Fruit* unknown.

Hill jungle near Port Mouat, S. Andaman, *King's Collector*.

In the characters of the corolla-lobes this species seems to be intermediate between *Mimusops* and *Imbricaria*, and, since Engler has recently reduced *Imbricaria* to a section of *Mimusops*, we have no hesitation in describing it under that genus.

## Order LXXII. EBENACEÆ.

Shrubs or trees with usually hard wood. *Leaves* alternate, rarely sub-opposite, entire, usually coriaceous, ex-stipulate. *Flowers* usually diœcious, regular; the females usually (and the males sometimes) solitary; the males (and the females occasionally) in short, usually bracteate, axillary or extra-axillary cymes; pedicels articulated. *Calyx* inferior, gamosepalous, campanulate or tubular, with 3 to 7 valvate, imbricate or contorted, often accrescent, lobes. *Corolla* gamopetalous, variously shaped; the lobes 3 to 7, usually contorted, sometimes imbricate or valvate in bud. *Stamens* in the ♂ and ♀ flowers in a single series, and as many as the corolla-lobes, or 2- or more-seriate and 2 or more times as many; filaments shorter than the anthers, free or in pairs, or variously connate below; anthers linear, usually with longitudinal dehiscence, the connective often apiculate; in the ♀ flowers reduced to staminodes with empty or abortive anthers, or absent. *Disk* none. *Carpels* in the ♂ flowers abortive or absent; in the ♂ or ♀ flowers connate into a sessile superior ovary, with 2 to 8 usually more or less united styles; the cells as many as or twice as many as the styles with imperfect septa; ovules twice as many as the styles, anatropous, pendulous from the inner angles of the cells. *Fruit* a coriaceous or fleshy berry, several- or few-seeded. *Seeds* pendulous, usually oblong, vertically furrowed; testa thin; albumen copious, uniform or ruminant; embryo axial; radicle superior.—DISTRIB. About 320 species, in the tropics generally.

Flowers often 3-merous; ovary 3- or 6-celled ..	..	..	1. MABA.
Flowers mostly 4-5-merous; ovary 4-5 or 8-10-celled ..	..	..	2. DIOSPYROS.

## 1. MABA, Forst.

Trees or shrubs; leaves alternate, entire. *Flowers* diœcious (monœcious in *M. Maingayi*), axillary, shortly pedicellate or in small dense cymes; usually 3-merous, rarely 4- or 5-merous. *Calyx* 3- to 5-fid or partite, rarely sub-truncate, often cup-shaped and accrescent. *Corolla-tube* usually longer than the calyx; lobes of the limb 3, twisted to the right hand. *Male flowers*: *stamens* 3 to 21; filaments distinct, in pairs or otherwise united; anthers oblong; ovary rudimentary. *Female flowers*: *staminodes* 0 to 12; *ovary* 3-celled or perfectly or imperfectly 6-celled, 6-ovulate. *Fruit* ellipsoid or globose, baccate, glabrous or hairy, 1-6-celled and 1-6-seeded, rather dry or fleshy; albumen not ruminant.—DISTRIB. Species about 70; tropical.



Leaves opposite or almost opposite .. ..	1. <i>M. Hierniana</i> .
Leaves alternate :—	
Leaves puberulous on the lower surface, their veins prominent..	2. <i>M. venosa</i> ..
Leaves densely velvety pubescent on the lower surface, their veins obsolete .. ..	3. <i>M. olivacea</i> .
Leaves glabrous or nearly so :—	
Leaves broadly ovate or elliptic, 3 to 5 in. long and 1·65 to 2·65 in. broad; main-nerves 3 to 5 pairs .. ..	4. <i>M. merguensis</i> .
Leaves oblong to oblong-lanceolate 1·5 to 3 in. long and ·65 to 1·35 in. broad :—	
Main-nerves 6 or 7 pairs; fruit globular .. ..	5. <i>M. Clarkeana</i> .
Main-nerves obsolete; fruit obliquely ellipsoid .. ..	6. <i>M. perakensis</i> .
Leaves polymorphous (mostly elliptic obovate or sub-rotund); fruit globular, fusiform .. ..	7. <i>M. burxifolia</i> .

1. *MABA HIERNIANA*, King & Gamble, n. sp. A small glabrous shrub; young branches much thinner than a goose-quill, pale, glabrous. *Leaves* opposite, thinly coriaceous; oblong-elliptic, the apex shortly acuminate, the base cuneate, the edges slightly recurved when dry; both surfaces hepatic-brown when dry and shining, the reticulations on the upper distinct; main-nerves 8 to 10 pairs, curved, ascending and forming wide arches near the edge, prominent on the lower surface, faint on the upper; the midrib bold on both; length 6 to 10 in.; breadth 2 to 3·5 in.; petioles ·3 to ·6 in. *Male flowers* unknown. *Female flowers* rotate, ·4 in. across, almost sessile, in axillary or extra-axillary fascicles of 2 or 3. *Calyx* spreading, divided almost to the base into 3 to 5 rotund, minutely crenate, slightly imbricate lobes. *Corolla* nearly twice as long as the calyx, deeply divided into 5 broadly oblong blunt lobes with slightly recurved edges; staminodes 3 or 4, with short thick filaments and broad antherodes. *Ovary* depressed-hemispheric, with short, thick, conical style and small stigma. *Fruit* not seen.

PERAK: *King's Collector* 7920.

2. *MABA VENOSA*, King & Gamble. A tree 15 to 50 feet high; young branches twice as thick as a crow-quill, the bark pale and deciduously cinereous-puberulous. *Leaves* alternate, thinly coriaceous; oblong-elliptic, acute or shortly acuminate, the base slightly cuneate or rounded; both surfaces dark olivaceous when dry; the upper shining, glabrous except the puberulous depressed midrib and main-nerves; the reticulations minute but distinct; lower puberulous everywhere and the midrib prominent; main-nerves 6 to 9 pairs, prominent, curved, spreading, interarching boldly near the edge; length 4·5 to 6·5 in.; breadth 2 to 3 in.; petioles ·35 to ·5 in. *Male and female flowers* alike, in densely crowded extra-axillary cymose fascicles of 5 or 6, not longer than the petioles; flowers mostly sessile, one or

two in each fascicle on a short densely hairy pedicel, rotate, .3 or .4 in. in diam. *Calyx* very coriaceous, divided to the base into 3 spreading broadly ovate lobes with broad blunt apices and concave bases, partly adpressed-pilose and partly glabrescent. *Corolla* smaller and less coriaceous than the calyx, tubular, glabrous, its lobes ovate-elliptic. *Male flowers* with 6 stamens in 2 rows, 3 of them small; anthers cordate, filaments flat; rudimentary ovary ovoid, apiculate, with a dense ring of coarse hair at its base. *Female flowers* with a few flat staminodes; the ovary broadly ovoid apiculate, hirsute in its lower part; styles 3, glabrous, distinct, the stigmas broad. *Fruit* ovoid-globular, glabrous, .75 in. long and .6 in. in diam., blunt at apex and base, the latter subtended by the 3- sometimes 4-lobed, thick, almost woody, accrescent calyx, its lobes spreading, their edges reflexed. *Seeds* elliptic, plano-convex. *Diospyros venosa*, Wall. Cat. 4126.

SINGAPORE: *Ridley* 4961; *King's Collector* 3495, 3862, 7643.

3. *MABA OLIVACEA*, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches half as thick as a goose-quill, puberulous, pale cinereous when dry. *Leaves* coriaceous, alternate; elliptic, shortly and abruptly apiculate, the base rounded or cuneate, the edges much recurved when dry; upper surface olivaceous, shining, glabrous except the depressed rusty-puberulous midrib; lower surface softly velvety-pubescent, olivaceous, the hair on the bold midrib and 5 to 8 pairs of curved spreading rather prominent main-nerves rusty; length 3 to 5.5 in.; breadth 1.5 to 2.25 in.; petiole .4 in., tomentose. *Male flowers* sessile, .15 in. long, in branched condensed axillary and extra-axillary cymes less than 1 in. long; bracteoles broad, blunt, small. *Calyx* .1 in. long, tubular-campanulate, tomentose outside, glabrous inside, divided nearly to the base into 4 broadly ovate obtuse erect lobes. *Corolla* cylindric-campanulate, glabrous except the hairy edges of the 4 oblong lobes. *Stamens* 8 large and 4 small, lanceolate, on short filaments. *Female flowers* not seen. *Fruit* ellipsoid, blunt at each end, the apex crowned by the short style, glabrous, about .5 in. long, and .4 in. in diam. *Calyx* at the base of the fruit thick, spreading, .6 in. across, with 4 ovate, blunt lobes with reflexed edges.

PERAK: *King's Collector* 7877; *Wray* 1269. LANKAWI: *Curtis* 1661.

4. *MABA MERGUENSIS*, Hiern in Trans. Camb. Phil. Soc. XII. 134 (1873). A small, nearly glabrous tree; young branches thicker than a crow-quill. *Leaves* alternate, thinly coriaceous, ovate or elliptic, shortly and obtusely acuminate, the base cuneate or rounded; main-nerves 3 to 5 pairs, slightly curved, ascending; length 3 to 5.5 in.; breadth 1.65 to 2.65 in.; petiole about .25 in. long. *Male flowers* in dense minutely

pubescent branching axillary cymes only 1 to 1·5 in. in diam. *Calyx* less than ·25 in. long, with 3 or 4 obtuse triangular lobes. *Corolla* slightly larger than the calyx, shortly 3- or 4-lobed. *Stamens* 14 to 16, glabrous; rudimentary ovary minute. *Female flowers* 3- or 4-merous. *Calyx* lobed half-way down. *Corolla* 3- or 4-merous; *Staminodes* 3 or 4. *Ovary-cells* 6, 1-ovulate. *Styles* 3, distant, glabrous. *Fruit* sub-globular; its calyx ·5 in. in diam. with 3 ovate acute spreading lobes. Kurz in Journ. As. Soc. XLVI., ii. 232, and For. Fl. II. 139; Clarke in Hook. f. Fl. Br. Ind. III. 552.

PENANG: *Helper* (K.D.) 3618; *Curtis* 705, 718.—DISTRIB. Burma.

Very imperfectly represented in Herbaria.

5. *MABA CLARKEANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, puberulous when young, ultimately glabrous, cinereous with small black striæ. *Leaves* alternate, coriaceous; oblong, the apex blunt and sometimes minutely notched, the base cuneate; upper surface olivaceous, glabrous, shining when dry; lower surface dull, paler, sparsely and deciduously adpressed-pubescent and the minute reticulations rather distinct; main-nerves 6 or 7 pairs, spreading, very faint on both surfaces; midrib bold in the lower, depressed on the upper surface; length 1·5 to 3 in., breadth ·65 to 1·25 in.; petioles ·1 in. long. *Male flowers* small (only ·1 to ·15 in. long), crowded in sessile cymes ·25 to ·5 in. long, in the axils of the upper leaves, with a few oblong bracteoles. *Calyx* sessile or subsessile, adpressed-pubescent outside, glabrous inside, divided half-way down into 3 sub-erect broadly ovate acute lobes. *Corolla* smaller than the calyx, densely sericeous outside, glabrous inside, divided to the base into 3 ovate-lanceolate, with an inner row of 3 or 6 similar but narrower, lobes. *Stamens* 6, in pairs, joined by the bases of their broad filaments; anthers lanceolate. *Female flower* unknown. *Fruit* globular, ·35 in. in diam., glabrous. *Calyx* at its base thick, with 3 obtuse angles. *Seeds* 3, 3-sided, ·25 in. long.

PERAK: *King's Collector* 4816.

6. *MABA PERAKENSIS*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches as thick as a crow-quill, minutely puberulous becoming glabrous, dark-coloured, sub-glaucous. *Leaves* coriaceous, alternate; rather broadly oblong to oblong-lanceolate, the apex acute, the base broad and rounded or slightly cuneate; both surfaces dark olivaceous, the upper shining, the lower dull; main-nerves obsolete; midrib minutely pubescent, prominent on the lower surface, depressed on the upper; length 2·5 to 3 in., breadth ·75 to 1·35 in.; petioles

·15 in. long. *Male flowers* about ·15 in. long, 8 or 10 together in dense sessile axillary clusters not much exceeding the petioles. *Calyx* sessile or nearly so, campanulate, slightly pubescent outside, glabrous inside, deeply divided into 3 broadly ovate acute lobes. *Corolla* tubular; adpressed-sericeous externally, glabrous inside, cut half-way down into 3 ovate acute lobes. *Stamens* 12, 6 of them united by the bases of their filaments; anthers of all lanceolate apiculate, their bases cordate. *Female flower* not known. *Fruit* obliquely ellipsoid, the apex shortly apiculate, glabrous; the calyx at the base sub-ligneous, flat, deeply divided into 3 broad ovate-rotund lobes with reflexed edges and blunt tips. *Seeds* 2, oblong.

PERAK: *Wray* 3130; *King's Collector* 3945, 5519.

7. MABA BUXIFOLIA, Pers. Syn. II. (1807) 606. A bush or small tree; young branches puberulous at first, ultimately glabrous. *Leaves* small, alternate, coriaceous; varying from elliptic to obovate, the apex sub-acute or obtuse, the base always narrowed; upper surface olivaceous, the lower brown; the midrib bold; reticulations rather distinct on the upper surface only; main-nerves 4 to 6 pairs, spreading, slightly prominent on the upper surface, indistinct on the lower; edges slightly recurved; length ·35 to 1 in.; breadth ·3 to ·6 in.; larger in the varieties; petiole less than ·5 in. *Flowers* solitary, or 2 to 3 in short cymes, 3-merous. *Calyx* ·1 in. long, campanulate, with short triangular lobes. *Corolla* campanulate with short triangular lobes. *Male flowers*: *stamens* 6 to 12, glabrous; rudimentary ovary hairy. *Female flower*: *stamens* none; *ovary* 3-celled; style at the apex 3-lobed. *Fruit* globose or ellipsoid, ·35 in. long, 1-seeded. *Calyx* at its base cupular, often very short; albumen equable. Wight Ic. t. 763; A. DC. Prod. VIII. 240; Thwaites Enum. Pl. Ceyl. 183; Trimen Fl. Ceyl. III. 89; Hiern in Trans. Camb. Phil. Soc. XII. 116; Kurz For. Fl. II. 139; Clarke in Hook. f. Fl. Br. Ind. III. 551. *M. littorea*, Br. Prod. 527. *M. Cumingiana*, *M. madagascariensis*, *M. guineensis*, *M. Smithiana*, A. DC. l.c. 241. *M. neilgherrensis*, Wight Ill. t. 148 bis. E. *M. Ebenus*, Wight Ic. tt. 1288-9 (not of Spreng.). *Maba*? Wall. Cat. 7461. *Ferreola buxifolia*, Roxb. Cor. Pl. I. 35, t. 45, and Fl. Ind. III. 790.

MALACCA: *Maingay* (K.D.) 979; *Griffith* (K.D.) 3641. LANGKAWI: *Curtis* 2557. PENANG: *Curtis* 708.—DISTRIB. Malay Archipelago, Br. India, N. Australia, Philippines, tropical Africa.

A variable species, of which two varieties are recognised by Mr. C. B. Clarke in Hooker's "Flora of British India." Both these have leaves longer than as above described, but neither occurs in our region.

2. DIOSPYROS, Linn.

Trees, rarely shrubs. *Leaves* alternate or rarely sub-opposite, entire. *Flowers* dioecious, very rarely polygamous, axillary and short-pedicelled, or in small cymes; the ♀ often, and the ♂ sometimes, solitary; usually 4- or 5-merous, rarely 3-merous. *Calyx* usually deeply-lobed, rarely truncate, often in the ♀ larger than in the ♂ and often accrescent and plicate or auriculate in fruit. *Corolla* tubular with short deep lobes, or salver-shaped, or campanulate; the lobes contorted to the right in bud. *Stamens* in the ♂ *flowers* 4 to 64, often 16; their filaments distinct, paired or polyadelphous; anthers linear, rarely short; *ovary* rudimentary. In the ♀ *flowers*, *staminodes* 0 to 16; *ovary* 4-5-celled or imperfectly 8-10-celled; the cells usually with 1, rarely with 2 ovules; styles or stigmas 1 to 4. *Fruit* a globose, ellipsoid or ovoid-conic, berry, usually subtended by the enlarged (sometimes woody) calyx; flesh pulpy or viscid. *Seeds* oblong, usually compressed; albumen equable or (rarely) ruminant.—**DISTRIB.** About 220 species, chiefly in the tropics.

Leaves membranous or thinly coriaceous, glabrous or hairy; ♂ flowers in small cymes or fascicles, 4-5-merous; stamens usually 8, 12, or 16; flowers sub-solitary; ♀ calyx longer than that of the ♂, not accrescent or but slightly so, in fruit:—

Leaves under 5 in. long:—

- |                                                                                                                          |                            |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Fruit globular, glabrous; stamens 16 .. .. .                                                                             | 1. <i>D. Wrayi</i> .       |
| Fruit cylindric or oblong-conical, glabrous; stamens about 16; leaves 1 to 1.4 in. long, and under .65 in. broad .. .. . | 3. <i>D. microphylla</i> . |

Fruit ellipsoid:—

Stamens 8:—

Fruit puberulous:—

- |                                                                          |                              |
|--------------------------------------------------------------------------|------------------------------|
| Leaves usually under 2.25 in. long, lanceolate or sub-rhomboidal .. .. . | 2. <i>D. subrhomboidea</i> . |
| Leaves usually over 2.25 in. long, elliptic-oblong .. .. .               | 6. <i>D. Scortechinii</i> .  |

Fruit glabrous; leaves 2.5 to 4.5 in. long .. .. .	5. <i>D. graciliflora</i> .
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Stamens 12; leaves 3.25 to 5 in. long; fruit glabrous .. .. .	7. <i>D. flavicans</i> .
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Fruit not known; stamens 12; leaves under 2 in. long .. .. .	4. <i>D. dumosa</i> .
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Leaves over 5 in. long; fruit ovoid-conic, rusty-setose; stamens 6 to 12 .. .. .	8. <i>D. apiculata</i> .
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Leaves coriaceous, upper surface glabrous and shining; flowers mostly 4-merous, a few 5-merous; ♂ flowers in small cymes or clusters; calyx deeply lobed, often larger in the ♀ and differing in shape from that of the ♂:—

Calyx 4-lobed:—

Leaves under 5 in. long:—

Leaves under 1.5 in. broad:—

- |                                                                                                                                            |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Calyx of ♀ flower densely sericeous-pubescent, lobes reniform; fruit ovoid or sub-globose, rusty villous, its calyx 1 in. in diam. .. .. . | 9. <i>D. lanceifolia</i> . |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|

- Calyx-margins of ♀ flower tomentose, lobes broadly ovate; fruit globose, ultimately glabrous, .75 in. long 14. *D. lucida*.  
 Leaves 1.5 to 2.5 in. broad :—  
   Stamens about 12; main-nerves of leaves 8 to 9 pairs 10. *D. pachyphylla*.  
   Stamens about 16; main-nerves of leaves 6 to 7 pairs 11. *D. clavigera*.  
   Stamens 16, in pairs; main-nerves of leaves 5 pairs 13. *D. styraciformis*.  
 Leaves usually more than 5 and less than 7.5 in. long :—  
   Leaves under 6.5 in. long, over 2.5 in. broad; fruit olive-shaped, nearly 2 in. long and 1.25 in. in diam. .. 12. *D. bilocularis*.  
   Leaves under 2.5 in. broad :—  
     Leaves under 6.5 in. long; main-nerves of leaves not visible, probably many pairs; fruit depressed-globose, 1.35 in. in diam.; persistent calyx thick, woody .. 25. *D. oleifolia*.  
     Leaves under 7.5 in. long; main-nerves 5 to 8 pairs; fruit ellipsoid, 1 in. in diam.; persistent calyx with large membranous lobes .. .. 27. *D. paniculata*.  
 Leaves usually more than 6 and less than 12 in. long :—  
   Leaves beneath covered with appressed sericeous hair; stamens 20 to 24; main-nerves of leaves not visible .. 21. *D. argentea*.  
   Leaves beneath glabrous except the midrib, which is covered with dark hair; main-nerves of leaves 7 to 8 pairs; fruit glabrous .. .. 17. *D. tristis*.  
   Leaves beneath glabrous or only minutely puberulous :—  
     Leaves usually 3 to 3.5 in. broad :—  
       Main-nerves of leaves 8 to 10 pairs; apex caudate-acuminate, base cuneate .. .. 18. *D. pauciflora*.  
       Main-nerves of leaves 10 to 12 pairs; apex acute, base rounded .. .. 19. *D. ellipsoidea*.  
     Leaves reaching 4 in. broad; fruit glabrescent :—  
       Main-nerves of leaves 8 to 14 pairs; apex sub-acute 23. *D. Horsfieldii*.  
       Main-nerves of leaves 16 to 20 pairs; apex shortly acuminate .. .. 24. *D. toposioides*.  
     Leaves 3.5 to 4.5 in. broad; main-nerves of leaves 8 to 12 pairs; apex acute; fruit densely rusty-tomentose, ridged .. .. 28. *D. Kunstleri*.  
 Leaves 8 to 14 in. long, 2.5 to 5 in. broad; main-nerves 14 to 18 pairs; fruit sub-globose, 1 in. in diam., immersed in the thickened calyx .. .. 20. *D. Wallichii*.  
 Leaves 10 to 18 in. long, 2 to 4 in. broad; main-nerves 14 to 20 pairs; fruit depressed-globose, 2 in. in diam., seated on a cupular calyx .. .. 22. *D. rigida*.  
 Calyx 5-lobed :—  
   Leaves glabrous beneath, 7 to 9 in. long, 3 to 3.75 in. broad; main-nerves 16 to 18 pairs .. .. 15. *D. oblonga*.  
   Leaves puberulous on the midrib and main-nerves beneath, 5.5 to 7.5 in. long, 2.5 to 3.25 in. broad; main-nerves 10 to 12 pairs .. .. 16. *D. Helferi*.  
   Leaves glabrous beneath, 5.5 to 9 in. long, 1.5 to 2.5 in. broad; main-nerves 10 to 12 pairs .. .. 26. *D. brachiata*.  
 Leaves thinly coriaceous, glabrous above, puberulous beneath; both ♂ and ♀ flowers in few-flowered cymes, on long, slender, extra-axillary peduncles, pendulous; calyx 5-lobed, not accrescent in fruit .. .. 29. *D. nutans*.

SPECIES IMPERFECTLY KNOWN.

Calyx of fruit long, woody, its lobes pointed and much reflexed, leaves glabrous .. .. .	30. <i>D. reflexa</i> .
Leaves oblong, hairy beneath, cordate at the base. Calyx in fruit small. Fruit globular, rusty-pubescent .. .. .	31. <i>D. penangiana</i> .
Leaves quite glabrous, elliptic, narrowed at each end, not cordate. Fruit globular with small calyx .. .. .	32. <i>D. rufa</i> .
Leaves coriaceous, quite glabrous, oblong, areolar-reticulate. Male flowers in terminal tomentose cymes .. .. .	33. <i>D. areolata</i> .
Leaves membranous, oblong or oblong-elliptic, glabrous. Female flowers in fascicles of about 3. Calyx with reniform lobes; pedicels bi-bracteolate. Corolla salver-shaped .. .. .	34. <i>D. Curtisii</i> .
Leaves membranous, puberulous beneath. Male flowers in dense short hairy glomeruli. Stamens 8 .. .. .	35. <i>D. glomerulata</i> .
Leaves puberulous beneath. Calyx-lobes 4; stamens 16 .. .. .	36. <i>D. caliginosa</i> .

1. *DIOSPYROS WRAYI*, King & Gamble, n. sp. A shrub 4 to 12 feet high; young branches as thick as a crow-quill, cinereous- or rusty-puberulous. *Leaves* small, alternate, membranous; ovate-lanceolate to narrowly elliptic, shortly acuminate, the base cuneate; both surfaces dark olivaceous; the upper very shining and minutely reticulate, glabrous except the puberulous depressed midrib; the lower more brown and dull, the midrib pubescent and prominent, the reticulations less distinct; length 2 to 4 in., breadth .75 to 1.5 in.; petioles .05 to .1 in. *Male flowers* .25 in. long, 2 to 4 together in small axillary cymes, black when dry, puberulous, pedicels very short. *Calyx* less than .1 in. long, narrowly campanulate with 4 deep ovate lobes. *Corolla* three times as long as the calyx, salver-shaped, sub-glabrous; limb with 4 oblong lobes. *Stamens* 16, united in pairs by the bases of the unequal filaments, broadly lanceolate, inserted near the base of the tube. *Female flowers* like the ♂ but longer—especially the calyx. *Staminodes* about 8, lanceolate. *Ovary* glabrescent, ovoid-conic, tapering into a rather long style; stigmas 4, fleshy, short. *Fruit* globular, crowned by the short style, glabrous, shining, black when ripe (when dry); calyx at its base .75 in. across, coriaceous, deeply divided into 4 oblong blunt or sub-acute reflexed lobes.

PERAK: *Scortechini*; *Wray* 2764, 3272, 3955; *King's Collector* 2076, 2993.

2. *DIOSPYROS SUB-RHOMBOIDEA*, King & Gamble, n. sp. A shrub 4 to 6 feet high; young branches thinner than a crow-quill, softly tawny-pubescent, pale brown when dry. *Leaves* small, alternate; lanceolate or ovate-lanceolate or sub-rhomboidal, bluntly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper dark, glabrous except the puberulous midrib, the lower sparsely adpressed pubescent especially on the bold midrib; main-

nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1·5 to 2·25 in., breadth ·6 to ·8 in.; petiole about ·1 in. *Male flower* ·6 in. long, solitary, axillary on a short tomentose pedicel with 2 broad bracteoles. *Calyx* less than ·1 in. long, pubescent outside, glabrous inside, deeply divided into 4 broad obtuse almost quadrate imbricate lobes. *Corolla* salver-shaped; the tube cylindric, tapering to the apex, tomentose outside; limb as long as the tube but less hairy outside, glabrous inside like the tube, deeply divided into 4 oblong sub-acute lobes with inflexed edges, twisted to the right in bud. *Stamens* 8, attached near the bottom of the tube, 4 shorter than the others; anthers all lanceolate, and on short filaments. *Female flower* not known. *Fruit* ellipsoid, sparsely adpressed-puberulous, crowned by the conic style, ·8 or ·9 in. long and ·4 in. in diam. *Calyx* at its base ·25 in. across, flat, with 4 spreading, broad, blunt lobes.

PERAK: *Wray* 4055; *King's Collector* 7302.—DISTRIB. Sumatra, *Forbes* 2004.

3. DIOSPYROS MICROPHYLLA, Bedd. Ic. Pl. Ind. Or. 27, t. cxxxiii. (1874), and Fl. Sylv. Madr. cxlv. A tree 20 to 30 feet high; young branches as thick as a crow-quill or thinner, densely pubescent. *Leaves* thinly coriaceous, alternate, distichous; ovate-lanceolate, sub-rhomboid, the apex sub-acute, the base cuneate; upper surface dark olivaceous-brown, glabrous except the pubescent depressed midrib; the lower dark brown, puberulous, the midrib pubescent; main-nerves obsolete on both surfaces; length 1 to 1·4 in., breadth ·45 to ·65 in.; petiole ·05; the largest leaves towards the ends of the branches. *Male flowers* solitary or 3 together in a minute cyme. *Calyx* ·05 long, deeply 4-lobed, tube glabrate. *Corolla* slightly longer than the calyx with 4 rounded lobes. *Stamens* about 16. *Female flowers* ·2 in. long, axillary, solitary, pedicellate or in a pair on a short peduncle. *Calyx* campanulate, deeply divided into 4 sub-rotund imbricate very obtuse lobes, sericeous on the middle outside and on the edges, otherwise glabrous. *Corolla* salver-shaped, somewhat longer than the calyx, deeply cut into 4 unequal rotund lobes, adpressed-puberulous on the back of the lobes, otherwise glabrous. *Ovary* ovoid, sericeous near the apex and base; style thick, 2-fid; stigmas 4. *Ovary* 4-celled, ellipsoid, conic, 4-celled, cells 1-ovuled. *Fruit* cylindric or oblong-conical, dry, glabrous, 1-celled, 1- rarely 2-seeded, ·75 to 1 in. long. *Clarke* in Hook. fil. Fl. Br. Ind. III. 559. *D. buxifolia*, Hiern in Trans. Camb. Phil. Soc. XII. 218. *D. vaccinioides*, Wall. Cat. 4130 (*in part*). *Leucoxyllum buxifolium*, Blume Bijdr. 1169; *Miq.* Fl. Ind. Bat. II. 1050; *Choisy* Mem. Ternstr. 43 t. 2.

MALACCA: *Griffith* (K.D.) 3643; *Walker* 170; *Maingay* (K.D.) 966. SINGAPORE: *Ridley* 6045. PENANG: *Curtis* 1513, 7175. PERAK:



*Scortechini* 2052.—DISTRIB. Andaman Islands, South India, Malay Archipelago.

4. *DIOSPYROS DUMOSA*, King & Gamble, n. sp. A small tree; young branches as thick as a crow-quill, glabrous, dark-coloured when dry. *Leaves* small, alternate, membranous; lanceolate, shortly acuminate, the base cuneate; upper surface dark olivaceous when dry, glabrous; lower yellowish, slightly puberulous on the slightly prominent midrib and 4 or 5 pairs of curved ascending nerves; length 1·5 to 2 in.; breadth ·5 to ·75 in.; petiole ·05 in. *Male flowers* ·5 in. long, in small axillary sessile fascicles of 3 or 4. *Calyx* ·25 in. long, deeply divided into 3 or 4 ovate-lanceolate acuminate lobes, concave along the midrib, and with undulate edges, pubescent. *Corolla* twice as long as the calyx, narrowly tubular, deeply divided into 4 narrow oblong glabrous lobes, the tube pubescent inside and outside. *Stamens* 12, inserted at its base on unequal slender filaments; anthers broadly lanceolate, much apiculate. *Female flowers* solitary, axillary, shortly pedicellate, ·4 in. long. *Calyx* cleft to the base into 4 large broadly ovate reniform bluntly acuminate undulate lobes, sparsely adpressed-pubescent on both surfaces, ·25 in. long and as much across. *Corolla* a little longer but less hairy than the calyx, fleshy, tubular, tetragonous, divided for half its length into 4 narrow oblong lobes. *Staminodes* 8, linear-lanceolate, apiculate, on slender filaments. *Ovary* narrowly ellipsoid, tapering to the rather long style, glabrous. *Fruit* unknown.

PERAK: *Wray* 3508. JUNKSEYLO (Tongka): *Curtis* 2907.

5. *DIOSPYROS GRACILIFLORA*, Hiern in Trans. Camb. Phil. Soc. XII. 191 (1873). A glabrous tree 40 to 50 feet high; young branches less than half as thick as a goose-quill, deciduously puberulous, dark-coloured and striate when dry. *Leaves* thickly membranous, alternate; rather narrowly elliptic, shortly and bluntly apiculate to caudate-acuminate, the base much narrowed and often slightly oblique; both surfaces dull dark olivaceous-brown when dry, glabrous except for some minute hairs on the nerves beneath; main-nerves about 5 pairs, curved, ascending, depressed or obscure on the upper surface, pale and slightly prominent on the lower like the midrib; length 2·5 to 4·5 in., breadth ·75 to 1·35; petioles ·1 to ·2 in. *Male flowers* ·5 in. long, few together, in small axillary cymes about as long as the petioles, sessile, puberulous. *Calyx* large, two-thirds to one-half the length of the corolla, but much wider, deeply divided into 4 large ovate-rotund undulate semi-erect lobes. *Corolla* narrowly tubular, one-third to one-half longer than the calyx; the tube externally with 4 lines of pubescence, otherwise glabrescent; limb with 4 deeply oblong broad blunt glabrous spreading sub-undulate lobes. *Stamens* 8, in two rows,

4 of them smaller than the other 4; anthers linear-lanceolate, apiculate, the filaments flat, very short; rudimentary ovary small, narrowly ovate, glabrous. *Female flowers* like the ♂ and often mixed with them, but sometimes solitary. *Ovary* broadly ovoid, with short style, glabrous. *Fruit* ellipsoid, 1 in. long and .75 in. in diam., glabrous, crowned by the short remains of the style, and subtended by the calyx with 4 spreading, undulate, sub-glabrous lobes. *D. flavicans*, Hiern in Trans. Camb. Phil. Soc. XII. 205 (as to female plant partly). *D. decipiens*, Clarke in Hook. fil. Fl. Br. Ind. III. 563.

MALACCA: *Maingay* (K.D.) 972 (♀ only). PERAK: *Scortechini* 181, 198; *Wray* 1298, 2843, 3214, 4227; *King's Collector* 884, 3298, 3354, 3366, 3588, 3394, 5173, 6742, 7990, 10463. PENANG: *Curtis* 3041.—DISTRIB. Java, *Beccari* 1560.

6. *DIOSPYROS SCORTECHINII*, King & Gamble, n. sp. A tree 15 to 30 or even 50 feet high; young branches as thick as a crow-quill, tawny-puberulous, angled, pale when dry. *Leaves* alternate, small, membranous; narrowly elliptic-oblong, acuminate, much narrowed at the base to the short petiole; both surfaces olivaceous-brown when dry, the upper glabrous, the lower often puberulous, especially on the midrib; main-nerves 8 to 12 pairs, spreading, curved, ascending, somewhat distinct on the lower surface, faint on the upper as are the transverse reticulations; length 2 to 4 in., breadth .6 to 1.25 in.; petiole .1 to .15 in. *Male flowers* .5 in. long, in shortly pedunculate axillary fascicles of 2 or 3, or solitary and pedicellate. *Calyx* .1 in. long, tomentose outside, glabrous inside, .1 in. long, campanulate, deeply divided into 4 broad almost truncate lobes. *Corolla* coriaceous, .3 in. long, glabrous; tube tapering a little to the apex; lobes 4, oblong, sub-acute, spreading. *Stamens* 8; anthers shortly lanceolate, as long as the filaments. *Female flowers* longer than the ♂, solitary, the pedicel as long as the calyx, tomentose. *Ovary* ellipsoid, densely pilose; style short, conic; stigmas small, glabrous. *Fruit* ellipsoid, crowned by the very short style, puberulous. *Calyx* at its base cupular, .2 in. across, tomentose outside, .75 in. long and .4 in. in diam.

PERAK: *Curtis* 2092; *King's Collector* 2407, 4126, 5002, 5296, 6356; *Scortechini* 377; *Wray* 638.

7. *DIOSPYROS FLAVICANS*, Hiern in Trans. Camb. Phil. Soc. XII. 205 (1873). A tree 40 to 70 feet high; young branches rather thicker than a crow-quill, cinereous-puberulous becoming glabrous. *Leaves* alternate, thinly coriaceous; elliptic to oblong-elliptic, apex shortly acuminate, the base cuneate; upper surface when dry olivaceous, glabrous, the lower pale brown, densely puberulous on the stout midrib; main-nerves 5 to

7 pairs, curved, ascending; length 3.25 to 5 in., breadth 1.35 to 2.5 in.; petioles .1 to .15 in. *Male flowers* .45 in. long, 2 to 6 together, in axillary or extra-axillary bracteate sessile tomentose fascicles. *Calyx* sub-sessile, campanulate, pubescent outside, glabrous inside; the limb deeply divided into 5 broadly ovate, bluntly acuminate spreading lobes. *Corolla* salver-shaped; tube slightly inflated and glabrous in the lower half outside, cylindric and pubescent in the upper half, inside glabrous; limb with 4 broadly oblong obtuse glabrescent spreading lobes. *Stamens* 12, of different lengths, attached in 3 rows in the tube; anthers lanceolate-cordate, apiculate; filaments slender and of varying length; rudimentary ovary none. *Female flowers* conspicuously bi-bracteate, in cymes like the ♂ but shortly pedunculate. *Calyx* as in the ♂ but less deeply lobed. *Fruit* ellipsoid, not much narrowed at the ends, slightly tetragonous, glabrous, .75 in. long and about .35 in. in diam., crowned by the short remains of the style; the calyx clasping its base, about half as long, with 4 deep triangular lobes. *Seeds* 4, ridged. Clarke in Hook. fil. Fl. Br. Ind. III. 562; Kurz in Journ. As. Soc. Beng. XLVI., ii. 236, For. Fl. II. 135. *Guatteria*? *flavicans*, Wall. Cat. 7295. *Ebenacea*, sp. 2, Griff. Notul. IV. 291.

MALACCA: Griffith (K.D.) 454, 3623; Maingay (K.D.) 972 (as to male plant only); Helfer (K.D.) 3639? PENANG: Curtis 1602. SELANGOR: Ridley 10556. PERAK: 2058; King's Collector 2480, 3354, 3380, 3774, 6149, 6633, 10007.

8. *DIOSPYROS APICULATA*, Hiern in Trans. Camb. Philos. Soc. XII. 186 (1873). A shrub or small tree; young branches half as thick as a goose-quill, fulvous-hirsute. *Leaves* alternate, membranous; oblong or elliptic-oblong, sometimes rather oblanceolate, finely caudate-acuminate, slightly narrowed to the rounded or somewhat cuneate base; both surfaces dark olivaceous-brown when dry, transversely reticulate; upper surface sparsely adpressed-pubescent, the midrib and main-nerves pubescent and slightly depressed; lower surface darker, and with many long rather coarse hairs, especially on the prominent midrib and 8 to 10 pairs of slightly curved ascending main-nerves; length 5.5 to 7 in., breadth 1.5 to 2.5 in.; petiole .1 in., tomentose. *Male flowers* about 3 together, axillary, sub-sessile, .35 in. long. *Calyx* 4- to 5-partite, about .25 in. long, pubescent, lobes narrowly lanceolate. *Corolla* tubular, 4-lobed, .4 in. long, the lobes spreading, oval, obtuse. *Stamens* 6 to 12, unequal, glabrous; anthers linear-oblong, acuminate; filaments often geniculate, dilated and somewhat united at the base, rudimentary ovary small, hairy. *Female flowers* 1 to 3 together on short axillary, minutely hispid cymes.

*Fruit* sub-sessile, solitary, ovoid-conic, finely rusty-setose, especially in the upper half, about 1 in. long and .5 to .75 in. across, apiculate. *Seeds* about 4, albumen not ruminant. Clarke in Hook. fil. Fl. Br. Ind. III. 553.

MALACCA: *Maingay* (K.D.) 1514. PERAK: *King's Collector* 5127, 6770. PENANG: *Curtis* 1584.

9. *DIOSPYROS LANCEÆFOLIA*, Roxb. Hort. Beng. 93 (1814). A tree; young branches twice as thick as a crow-quill, adpressed-puberulous, dark brown when dry. *Leaves* alternate, coriaceous; oblong, lanceolate or oblong-lanceolate, acute or acuminate, the base rounded or cuneate, the edges recurved; both surfaces olivaceous-brown when dry, the upper darker and shining, the lower paler and dull; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; midrib bold on the lower surface, depressed on the upper; length 2 to 3 in.; breadth .65 to 1 in.; petiole .15 to .2 in. *Male flowers* sessile in clusters. *Calyx* .15 in. long with 4 ovate tawny-sericeous lobes. *Corolla* .35 to .5 in. long, narrowed upwards, the lobes .15 in. long. *Stamens* about 16; anthers linear, glabrous or slightly pilose at the base; filaments minutely pilose. *Female flowers* solitary or in pairs on the branches below the leaves, .5 in. long. *Calyx* .3 in. long, very coriaceous, densely sericeous-pubescent on both surfaces, deeply divided into 4 erect, broadly reniform, acute lobes. *Corolla* a little longer than the calyx, densely sericeous-tomentose outside, the tube glabrous inside; lobes of limb 4, oblong, very thick. *Staminodes* 8, linear compressed. *Ovary* broadly ovate, acuminate, densely silky; stigmas 4, glabrous. *Fruit* ovoid or sub-globose, rusty-villous; its *calyx* 1 in. in diam. with thickened tube and spreading lobes. Roxb. Fl. Ind. II. 537; A. DC. Prod. VIII. 232; Hiern in Trans. Camb. Phil. Soc. XII. 213; Kurz in Journ. As. Soc. XLVI., ii. 236, and For. Fl. II. 136; Clarke in Hook. fil. Fl. Br. Ind. III. 562. *D. multiflora*, Wall. Cat. 4144; A. DC. l.c. 231. *D. amœna*, Wall. Cat. 4139; A. DC. l.c. 231.

SINGAPORE: *Ridley* 4964. PAHANG: *Ridley* 1601.—DISTRIB. Assam range of hills, Burma, Sumatra.

The chief characters separating this from *D. lucida*, Wall., are the longer lobes of the calyx of the female flower and the somewhat larger and more hairy fruit. This species is not common within our area, whereas *D. lucida* is a common tree.

10. *DIOSPYROS PACHYPHYLLA*, Clarke in Hook. fil. Fl. Br. Ind. III. 568 (1882). A tree; young branches rather thinner than a goose-quill, deciduously puberulous, soon glabrous. *Leaves* coriaceous, alternate; elliptic or oblong, sub-acute, the base rounded; both surfaces when

dry rather pale olivaceous-brown, glabrous; the upper shining, the lower glaucous, dull; main-nerves 8 or 9 pairs, curving upwards, faint on both surfaces midrib bold on the lower surface, depressed on the upper; length 3 to 5 in., breadth 1·5 to 2·5 in.; petiole ·25 to ·4 in. *Male flowers* in short rusty-pubescent axillary and extra-axillary cymes from ·5 to ·75 in. long, bracts ovate, ·1 in. long. *Calyx* ·15 in. long, campanulate, adpressed rusty-tomentose on both surfaces, cut half-way into 4 broad triangular erect lobes. *Corolla* tomentose externally (*vide* C. B. Clarke) nearly ·5 in. long, its lobes about ·1 in. *Stamens* about 12; anthers linear, with villous connective and glabrous filaments. *Female flowers* unknown. *Fruit* globular, the apex concave and bearing the short remains of the style, ·65 in. in diam., minutely rusty adpressed-pubescent, becoming glabrous; the *calyx* at its base woody, cupular, with 4 broad lobes with reflexed apices.

MALACCA: *Maingay* (K.D.) 974. SINGAPORE: *Ridley* 5644.

This does not agree with *D. undulata*, Wall., of which Hiern, in Trans. Camb. Phil. Soc. XII. 215, makes it a variety. It comes much nearer to, but is smaller in all its parts than, the plant named by us *D. Wallichii*, which was originally issued as *D. macrophylla*, Wall. Cat. 4141.

11. *DIOSPYROS CLAVIGERA*, Clarke in Hook. fil. Fl. Br. Ind. III. 558 (1882). A tree; all parts glabrous except the minutely pilose-ciliate margin of the calyx. *Leaves* alternate, coriaceous, elliptic, tapering slightly to each end (sub-rhomboidal); both surfaces warm brown when dry, the upper glabrous, shining, the lower dull; main-nerves 6 or 7 pairs, little curved, ascending, slightly prominent on the lower surface, faint on the upper; length 3·25 to 4·5, breadth 1·5 to 2·15 in.; petioles ·15 to ·2 in. *Male flowers* 3 to 16 together in small sub-sessile axillary and extra-axillary cymes. *Calyx* ·15 in. long, deeply divided into 4 obtuse lobes. *Corolla* (in bud) ·35 in. long, clavate, glabrous outside, the upper part very thick, 4-lobed. *Stamens* about 16, glabrous; anthers oblong, shortly apiculate. *Female flower* and fruit unknown. *D. Ebenum*, Hiern (*not of Koenig*) in Trans. Camb. Phil. Soc. XII. 208 (*in part*).

MALACCA: *Maingay* (K.D.) 971; *Griffith* (K.D.) 3635. LANGKAWI: *Curtis* 3418. SINGAPORE: *Maingay* 5066.

12. *DIOSPYROS BILOCULARIS*, Oliver in Hook. Ic. Pl. t. 2336 (1894). A glabrous tree 60 to 80 feet high; young branches about the thickness of a goose-quill, dark purplish when dry and shining, slightly striate. *Leaves* thickly coriaceous; elliptic, sub-acute, the base slightly cuneate, the edges (when dry) recurved; both surfaces olivaceous when dry, the upper shining, the lower paler and dull; midrib inconspicuous and

slightly channelled on the upper surface, bold on the lower; main-nerves 10 to 12 pairs, slightly curved, spreading, interarching far from the edge, faint on both surfaces; length 5 to 6·5 in., breadth 2·5 to 3·25 in. *Male flowers* ·65 in. long (in bud) on rusty-pubescent pedicels ·3 to ·4 in. long, in axillary and extra-axillary fascicles of 2 to 4, with a few tomentose bracteoles at their bases. *Calyx* very coriaceous, ·25 in. long and nearly as much in width at the mouth; limb 4-lobed, the lobes very short and broad. *Corolla* narrowly tubular, ·4 in. long, very thick; lobes of limb long, narrowly oblong. *Stamens* 16; sub-sessile, linear, sub-equal, apiculate; rudimentary ovary none. *Female flower*; calyx and corolla as in the ♂, staminodes none; ovary oblong or oval-ovoid, narrowed at the apex, longer than the calyx, 2-celled; ovules 2 in each cell and pendulous. *Fruit* olive-shaped, shortly apiculate, 1·5 to 2 in. long and 1 to 1·25 in. in diam. at the middle, yellow when ripe; its pedicel obconic, stout, woody, ·4 in. long; calyx in ripe fruit flat, with 4 broad blunt lobes. *Seed* solitary; pericarp thin, only ·3 in. across, albumen large stellately ruminant. *Maba Maingayi*, Hiern in Trans. Camb. Phil. Soc. XII. 107; Clarke in Hook. fil. Fl. Br. Ind. III. 552.

MALACCA: *Maingay* (K.D.) 976; *Derry* 1092. SINGAPORE: *Ridley* 27, 2755, 4920. PERAK: at elevations of 1,500 to 2,000 feet, *King's Collector* 7383.

13. *DIOSPYROS STYRACIFORMIS*, King & Gamble, n. sp. A tree(?); young branches rusty-pubescent, slightly thicker than a crow-quill. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate, the apex sub-acute or acute, the base cuneate; upper surface dark olivaceous, shining, glabrous except the depressed midrib; the lower surface dull, paler, with deciduous rufous pubescence, especially on the prominent midrib; main-nerves about 5 pairs, ascending, little curved, slightly prominent on the lower surface only; length 2·5 to 4 in., breadth 1 to 2 in.; petiole ·2 to ·35 in. *Male flowers* a few together in short cymes grouped in small axillary clusters. *Calyx* ·2 in. long, narrowly campanulate, densely rusty-tomentose externally like the corolla, the mouth with deep narrowly-triangular teeth. *Corolla* ·5 in. long, narrowly tubular, cut half-way down into 4 oblong blunt lobes. *Stamens* 16, in pairs, unequal, linear, apiculate; filaments unequal in length; rudimentary ovary none. *Female flowers* solitary, calyx much longer than in the ♂; its 4 lobes thick, broad, reniform, rusty-pubescent. *Corolla* not known; ovary hairy. *Fruit* globose with the apex truncate and depressed in the middle, densely but minutely pale rusty-tomentose, ·5 in. long and about ·65 in. in diam. *Calyx* at its base deeply cupular with 4 spreading triangular teeth. *D. nov. spec.*, C. B. Clarke in Herb.

Kew. *D. hirsuta*, Linn. fil., ? var., Hiern in Trans. Camb. Phil. Soc. XII. 165.

MALACCA : *Maingay* (K.D.) 969. SINGAPORE : *Ridley* 3787.

Ridley's No. 1084, from Bukit Timah, in Singapore, seems to belong to this. The only specimen I have seen is imperfect.

14. *DIOSPYROS LUCIDA*, Wall. Cat. 4127 (1829). A tree 40 to 50 feet high; young branches from half as thick to as thick as a crow-quill, minutely puberulous, becoming glabrescent, dark-coloured. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, sub-acute or obtuse, the base rounded or cuneate, sometimes a little oblique; both surfaces when dry pale olivaceous-brown, glabrous; main-nerves 5 to 9 pairs, spreading, curved, faint on the lower surface, slightly depressed on the upper; midrib bold on the lower surface, somewhat depressed on the upper; length 1.25 to 4.5 in., breadth .5 to 1.5 in.; petioles .2 to .4 in. *Male flowers* sessile, in small fascicles. *Calyx* nearly .15 in. long, campanulate, with 4 erect broadly triangular lobes, tomentose on both surfaces. *Corolla* narrowly tubular, more than twice as long as the calyx, tetraginous in bud, sericeous-tomentose outside, the tube glabrous inside; limb deeply divided into 4 narrowly oblong thick lobes. *Stamens* 12 to 16, in pairs united by their short filaments and face to face; anthers linear, glabrous, minutely apiculate, and on short sericeous filaments; rudimentary ovary linear. *Female flowers* 1 or 2 together, axillary or extra-axillary, sub-sessile. *Calyx* longer than in the ♂, lobed nearly to the base; lobes broadly ovate, their recurved margins minutely tomentose. *Fruit* globose, .75 in. or more in diam., sub-truncate and slightly umbonate at the apex, adpressed rusty-pubescent at first, ultimately glabrous, 4-6-seeded; the accrescent *calyx* at its base woody, cupular, .6 in. across with 4 short broad reflexed lobes; albumen of seed not ruminant. A. DC. Prod. VIII. 233; Clarke in Hook. fil. Fl. Br. Ind. III. 568. *D. hirsuta*, var. *lucida* Hiern in Trans. Camb. Phil. Soc. XII. 163(not of Linn. fil.)

MALACCA : *Griffith* (K.D.) 3637; *Maingay* (K.D.) 970, 973, 977, 3,500; *Derry* 1439. PERAK : *Scortechini*; *Wray* 3018, 3056. PENANG : *Curtis* 250, 1602; *King's Collector* 1050, 1760. SINGAPORE : *Ridley* 2119, 2749, 3580, 4962, 4963, 6129, 8115, 9212, 9517.

This is probably only a southern form of the Indian species *D. lanceafolia*, Roxb.

15. *DIOSPYROS OBLONGA*, Wall. Cat. 4124 (1829). A tree; young branches thinner than a goose-quill, purplish-brown when dry, glabrous. *Leaves* alternate, coriaceous, glabrous; oblong-elliptic, shortly and abruptly apiculate, the base rounded or slightly cuneate; both surfaces

faintly reticulate, quite glabrous, shining; main-nerves 16 to 18 pairs, spreading, little curved, interarching boldly at a little distance from the edges, prominent on the lower surface, depressed on the upper; midrib very bold on the lower surface, depressed on the upper; length 7 to 9 in., breadth 3 to 3.75 in.; petiole .4 in., very stout. *Male flowers* about .5 in. long, salver-shaped, in short axillary cymes, coriaceous, subsessile, .5 in. long. *Calyx* and *corolla* everywhere adpressed-tomentose. *Calyx* shorter than the corolla, campanulate, cleft to near the base into 5 oblong, blunt, sub-erect lobes. *Corolla-tube* narrow, not constricted at the throat; limb with 5 large broad rotund lobes with recurved edges. *Stamens* 10, united in pairs by the bases of their filaments, the inner ones smaller, all inserted on the base of the calyx-tube. *Female flowers* 1 to 5 together, .25 to .3 in. long, with 5 deep ovate-oblong auriculate sub-plicate lobes. *Corolla* .35 in. long, densely hairy outside, deeply lobed; staminodes 5; *ovary* 10-celled, rusty-hairy. *Fruit* sub-globose, sub-truncate at base and apex, glabrous when ripe; the hispid accrescent *calyx* .75 in. across, its lobes auriculate; albumen of seed not ruminate. A. DC. Prod. VIII. 243; Hiern in Trans. Camb. Phil. Soc. XII. 243; Clarke in Hook. fil. Fl. Br. Ind. III. 569; Miq. Fl. Ind. Bat. II. 1045.

MALACCA: *Maingay* (K.D.) 967. PENANG: *Curtis* 1564, 2487. 3658. SINGAPORE: *Ridley* 2747, 3031, 6311. PERAK: *King's Collector* 3794, 4924, 7237, 8278.

16. DIOSPYROS HELFERI, Clarke in Hook. fil. Fl. Br. Ind. III. 569 (1882). A tree 20 to 30 feet high; young branches half as thick as a goose-quill, pale puberulous, the bark dark. *Leaves* alternate, coriaceous; elliptic or elliptic-oblong, sub-acute or obtuse, the base broad or sub-acute; the upper surface dark olivaceous-brown when dry, glabrous except the depressed puberulous midrib, the reticulations minute but distinct; lower brown, glabrescent but puberulous on the rather stout midrib and nerves; main-nerves 10 to 12 pairs, rather faint, spreading, horizontal, interarching boldly about .25 in. from the edge; length 5.5 to 7.5 in., breadth 2.5 to 3.25 in.; petiole .4 to .5 in., stout, pubescent. *Male flowers* unknown. *Female flowers* .5 in. long, axillary, solitary or 2 together, sessile. *Calyx* coriaceous, densely pubescent inside and out, deeply divided into 5 broadly oblong, sub-acute lobes, accrescent, and becoming concave along the midribs of the lobes. *Corolla* somewhat longer than the calyx, sericeous externally; the tube short, the limb-lobes deep, broadly oblong, blunt; staminodes few, flat. *Ovary* broadly ovoid, densely sericeous-tomentose. *Fruit* ovoid-ellipsoid, nearly 1 in. long, and slightly less in diam., glabrous; the accrescent *calyx* embracing its base deeply 5-lobed, plicate.



MALACCA : *Griffith* (K.D.) 3632. KEDAH : *Curtis* 2596, 8327? ; *Ridley* 327.

17. *DIOSPYROS TRISTIS*, King & Gamble, n. sp. A tree 40 to 50 feet high; young branches half as thick as a goose-quill, covered with deciduous almost black tomentum. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate, the base rounded or cuneate; both surfaces dingy olivaceous-brown when dry, minutely reticulate; upper surface glabrous, shining, the lower dull, the prominent midrib densely clothed with dark hairs; the 7 or 8 pairs of prominent ascending main-nerves and the intermediate spaces with a few similar hairs with bulbous bases; length 6 to 9 in., breadth 2 to 2.75 in.; petioles .4 to .5 in. *Male flowers* .3 in. long, in short axillary cymes .75 in. long, the branches and pedicels densely dark rusty-tomentose outside. *Calyx* glabrous inside; the mouth with 5 broad short obtuse teeth. *Corolla* fleshy, glabrous, like the calyx in shape and of about the same length. *Stamens* 24; anthers lanceolate, shortly appendiculate at the apex, sessile. *Female flowers* unknown. *Fruit* depressed-globose, glabrous, shining, nearly 2 in. in diam.; the *calyx* at its base thick, woody, flat, 1.5 in. across, with 5 spreading triangular lobes.

PERAK : *Wray* 2190; *King's Collector* 5521.

18. *DIOSPYROS PAUCIFLORA*, King & Gamble, n. sp. A glabrous shrub or small tree; young branches rather thinner than a goose-quill, their bark dark and rough. *Leaves* rather large, alternate, very coriaceous; oblong-lanceolate or -oblanceolate, shortly caudate-acuminate, the base slightly cuneate; upper surface olivaceous, shining, lower ochraceous, dull; main-nerves 8 to 10 pairs, spreading, curved, and interarching boldly .1 or .2 in. from the slightly recurved edge; length 5 to 10 in., breadth 1.75 to 3 in.; petiole .25 to .3 in., corrugated. *Male flowers* .3 in. long, sessile and in sessile axillary fascicles of from 3 to 6. *Calyx* .25 in. long, narrowly tubular, somewhat narrowed at base and apex, coriaceous, pale in colour, the mouth with 4 broad triangular short erect lobes, outer surface with a layer of minute adpressed tawny tomentum and scattered over it many black adpressed hairs; the interior paler, pustular, with a few similar scattered hairs and a thick ring of them near the base surrounding the rudimentary ovary and clothing it also. *Corolla* slightly longer than the calyx, fleshy, widely tubular, divided for half its length into 4 broad obtuse lobes with a broad line of adpressed black hairs along the midrib of each outside, the rest of the outer surface adpressed-sericeous, the interior quite glabrous. *Stamens* 12, viz., 8 in pairs standing face to face and united by their short filaments, and 4 free; anthers of all linear, densely hairy, on short glabrous filaments. *Female flowers* not seen.

PERAK: *King's Collector* 7363, 7749.

19. *DIOSPYROS ELLIPSOIDEA*, King & Gamble, n. sp. A tree or shrub; young branches somewhat thinner than a goose-quill, deciduously and densely rusty-puberulous. *Leaves* alternate, thinly coriaceous; oblong to elliptic-oblong, rarely slightly oblanceolate, apex acute, base rounded; both surfaces when dry olivaceous-brown, the upper glabrous, the midrib sometimes rusty-puberulous, the lower surface darker, minutely puberulous; midrib and 10 to 12 pairs of curved ascending nerves faintly prominent on the lower and depressed on the upper surface; length 6 to 10 in.; breadth 2·25 to 3·5 in.; petioles ·25 to ·3 in. *Male flowers* in dense axillary cymes of 6 to 12, not much longer than the petioles; bracteoles few, broad, densely rusty-tomentose. *Calyx* sub-sessile, tomentose externally, glabrous internally, divided into 4 sub-rotund blunt lobes. *Corolla* glabrous, very fleshy towards the apex, with 4 broad deep lobes. *Stamens* at the base of the tube, broadly ovate, apiculate, filaments flattened. *Female flowers* in sub-sessile clusters of 3 or 4. *Calyx* with 4 rounded lobes, reflexed, coriaceous, and in fruit only ·35 in. across. *Fruit* ellipsoid, glabrous, crowned by the short style and subtended by the reflexed broadly-lobed small calyx, 1 to 1·25 in. long and ·8 in. in diam. *Seeds* few, ellipsoid, apiculate, two of the sides compressed.

PERAK: *King's Collector* 2233, 3250, 7098, 7269, 7320, 7689, 8215; *Scortechini* 1615.

20. *DIOSPYROS WALLICHII*, King & Gamble. A tree 30 to 60 feet high; young branches covered with minute coarse hair, the older verrucose. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, apex acute, base cuneate or rounded; edges slightly recurved; upper surface glabrous and shining, lower paler, minutely pubescent at first but becoming glabrescent, both olivaceous when dry; midrib depressed on the upper surface, bold on the lower; main-nerves 14 to 18 pairs, slightly curved, spreading, prominent on the lower surface, faint on the upper; length 8 to 14 in., breadth 2·5 to 5 in.; petiole ·5 to ·75 in. *Male cymes* ·5 to ·75 in. long, in clusters (often crowded) on the branches, 7-10-flowered; bracteoles broad, blunt, concave, thick like the calyx and corolla, and like them densely rusty-tomentose externally. *Calyx* ·1 to ·15 in. long, tubular; the mouth with 4 blunt triangular erect teeth; tomentose on both surfaces. *Corolla* thrice as long as the calyx; narrowly tubular, glabrous inside. *Stamens* 16, in 2 rows, the inner attached to the outer at the bases of their filaments; all linear; rudimentary ovary small, hairy. *Female flower* rather larger than the ♂, but in smaller cymes; the *calyx* tetragonous and deeply grooved, very fleshy, becoming woody, very large and boldly 4-angled and

grooved in the ripe fruit. *Corolla* as in the ♂, but somewhat longer. *Staminodes* about 16. *Ovary* conical densely hairy; stigma glabrous, with 4 deep oblong truncate lobes. *Fruit* 1 in. in diam., nearly twice as much across the calyx, sub-globose, deeply immersed in the large thickened calyx, its apex truncate-concave; seeds 4 or 5. *D. macrophylla*, Wall. Cat. 4141 (not of Blume). *D. undulata*, Wall. A. DC. Prod. VIII. 233; Hiern in Trans. Camb. Phil. Soc. XII. 216 (in part); Kurz in Journ. As. Soc. Beng. XLVI. ii. 23, and For. Fl. II. 135 (in part); Clarke in Hook. fil. Fl. Br. Ind. III. 568.

PENANG: Curtis 1085; Ridley 7174. MALACCA: Maingay (K.D.), 974; Griffith (K.D.) 3636. PERAK: Scortechini 1976; Wray 2535, 2865. King's Collector 2966, 2982, 4058, 6779, 7459, 7619, 10123. KEDAK: Curtis 2594. SELANGOR: Ridley 2748, 8544.

This is the plant issued by Wallich as No. 4141 of his Catalogue under the name *D. macrophylla*. Being different from the older *D. macrophylla* of Blume, a new name had to be found for it. This was done by De Candolle, who reduced it, as a variety, to Wallich's *D. undulata* with the type specimen of which in Wallich's own herbarium it does not agree. De Candolle was followed by Hiern, Kurz, and Clarke; we now restore it to specific rank. The true *D. undulata*, Wall., is a Burmese species. It is found also in the Andaman Islands, but it has not as yet been collected in Malaya.

21. DIOSPYROS ARGENTEA, Griff. Notul. IV. 288 (1854). A tree 15 to 50 feet high; young branches about as thick as a goose-quill, covered with sub-deciduous yellowish silky hairs. *Leaves* large, coriaceous; oblong, apex acute, base rather abruptly cuneate or rounded; upper surface warm brown when dry, glabrous and shining, the midrib depressed; lower densely covered with yellowish adpressed sericeous hair, the midrib very stout; main-nerves invisible on both surfaces; length 6 to 10 in.; breadth 1·65 to 3·5 in.; petioles ·1 to ·25 in. *Male flowers* in somewhat supra-axillary few-flowered shortly pedunculate spike-like cymes 1 to 1·25 in. long (peduncle included); bracts ovate ·2 in. long. *Calyx* ·25 in. long, deeply 4-lobed, villous. *Corolla* ·35 in. long, tubular, lobed half-way down, very villous outside. *Stamens* 20 to 24. *Female flower* solitary on a peduncle ·2 in. long; calyx campanulate, ·5 in. long, with ovate lobes. *Corolla* ·65 in. long. *Staminodes* 4 to 5. *Ovary* 4-celled, 8-ovuled, densely hairy; styles 4, erect, hairy. *Fruit* ellipsoid, apiculate, 2 to 2·5 in. long and 1 to 2 in. in diam., densely rusty-tomentose; the calyx persistent, its lobes enlarged, broad, very coriaceous, shortly hairy. Hiern in Trans. Camb. Phil. Soc. XII. 262; Clarke in Hook. fil. Fl. Br. Ind. III. 569. *D. discolor*, Wall. Cat. 4131 (not of Willd.).

MALACCA: Griffith (K.D.) 3625; Maingay (K.D.) 968, 970; Goodenough

1301, 1476. SINGAPORE: *Ridley* 3648, 5898; *Hullett* 825. PERAK: *Wray* 172, 1392; *King's Collector* 4812, 5862, 6387, 6896, 8003, 8142; *Scortechini* 498. PANGKORE: *Curtis* 1365. SELANGOR: *Ridley*. 10271. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 318 in Tahan woods.

22. *DIOSPYROS RIGIDA*, Hiern in Trans. Camb. Phil. Soc. XII. 257 (1873). A tree 30 to 60 feet high; young branches as thick as a goose-quill, minutely dark rusty-tomentose. *Leaves* alternate, very coriaceous, large; oblong or elliptic-oblong, equal-sided, the apex sub-acute, the base rounded and neither oblique nor cordate; upper surface dark olivaceous-brown when dry, shining, minutely reticulate; lower paler olivaceous-brown, covered except the midrib with a very thin film of minute tomentum, minutely reticulate; midrib very bold on the lower surface, pubescent at the sides, slightly depressed on the upper; main-nerves 14 to 20 pairs, spreading, interarching .35 in. from the edge, slightly distinct on the lower surface, invisible on the upper; length 10 to 18 in., breadth 2 to 4 in.; petiole .4 to .6 in., very stout. *Male flowers* when in bud .4 in. long and nearly .3 in. in diam., few, in short extra-axillary cymes, densely covered with black tomentum; the pedicels stout, deflexed, about .75 in. long. *Calyx* densely tomentose, ovoid, tapered to the apex, its mouth with 4 broad shallow blunt teeth. *Corolla* (apparently) not much longer than the calyx, very coriaceous, glabrous, the tube ovoid; the lobes short, oblong, blunt. *Stamens* about 20, inserted at the base of the tube, unequal; anthers lanceolate, apiculate, almost sessile. *Female flowers* unknown. Ripe *fruit* in cymes, depressed-globose, glaberrulous, with a woody rind, 1.75 in. in length from base to apex and 2 in. in diam.; remains of style none; *calyx* at base of fruit cupular, 1.5 in. across, divided into 4 reticulate leathery spreading broadly ovate lobes; peduncle .75 to 1.25 in. long, with dark hispid hairs.

PERAK: *King's Collector* 4024, 5732, 5971, 6801; *Wray* 3708.—  
DISTRIB. Borneo.

23. *DIOSPYROS HORSFIELDII*, Hiern in Trans. Camb. Phil. Soc. XII. 193 (1873). A tree 20 to 40 feet high, all parts except the cymes glabrous; young branches thinner than a goose-quill, pale. *Leaves* alternate, coriaceous; oblong-elliptic or ovate-oblong, apex sub-acute, base slightly cuneate or rounded, the edges slightly recurved when dry; upper surface when dry olivaceous-green, lower surface brown; the midrib and nerves depressed; the reticulations, midrib, and 8 to 14 pairs of curved spreading main-nerves very bold and prominent; length 6 to 10 in., breadth 2.5 to 4 in.; petioles .35 in. *Cymes* 2 to 3 in. long,

covered with black pubescence, few-flowered, collected on extra-axillary or axillary tubercles, sometimes forming small panicles, consisting mostly of ♂ flowers, and often with only a few ♀, with many oblanceolate blunt bracts .25 to .3 in. long, and some smaller bracteoles; branches of the cyme striate when dry. *Calyx* .15 in. long, divided to its base into 4 broadly ovate undulate lobes. *Corolla* in bud cylindric, tetragonous at the base; about .4 in. long, tomentose, deeply divided into 4 narrowly elliptic blunt lobes. *Stamens* about 16 in 2 rows, united into a tube, the anterior row smaller than the posterior, all narrow and apiculate, the filaments short and hairy. *Female flowers* like the ♂ as to calyx, but with corolla somewhat longer and with about 12 flat staminodes. *Ovary* ovoid-conic, tomentose, attenuated into a long style. *Stigma* with several small lobes; ovary 8-celled. *Fruit* when ripe ovoid-globular, 1 to 1.25 in. in diam., glabrescent, subtended by the accrescent calyx with large reticulate undulate lobes. *Seeds* compressed, oblong. Clarke in Hook. fil. Fl. Br. Ind. III. 571. *D. frutescens*, Hassk. Pl. As. Rar. 467 (not of Blume).

MALACCA: Griffith (K.D.) 3620. PERAK: Scortechini 1765; King's Collector 8261.—DISTRIB. Java.

Specimens of this sent from Herbarium Koordersianum, Buitenzorg, have pentamerous flowers; but in other respects they do not differ from the Perak specimens in Herb. Calcutta.

24. *DIOSPYROS TOPOSIODES*, King & Gamble, n. sp. A glabrous tree 15 to 40 feet high, sometimes only a shrub; young branches rather thinner than a goose-quill, pale brown and striate when dry. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate or acute, base rounded; edges slightly recurved when dry; both surfaces pale olivaceous when dry, minutely but distinctly reticulate, the upper shining, the lower darker and dull; midrib channelled on the upper surface, strong and prominent on the lower; main-nerves 16 to 20 pairs, spreading, little-curved, interarching far from the edge, the intermediate nerves nearly as prominent; length 7 to 11 in.; breadth 2 to 4 in.; petiole .3 to .4 in. long, stout, wrinkled when dry like the midrib. *Male flowers* .25 in. long, on pedicels longer than themselves, in cymose axillary panicles about 1 in. in length. *Calyx* coriaceous, glabrous, campanulate, with wide truncate entire or sub-entire mouth. *Corolla* slightly exceeding the calyx, ovoid, inflated below, contracted to the 4-toothed apex. *Stamens* numerous, linear, slightly auricled at the base, filaments very short. *Female flowers* when in bud .3 in. long, conical. *Calyx* acutely 4-angled in bud; the 4 lobes deltoid, very coriaceous, puberulous outside, rusty-tomentose inside like the ovary and young

fruit, accrescent in fruit. *Corolla* slightly longer than the calyx, tubular, with 4 short erect ovate lobes, quite glabrous. *Staminodes* about 12, flattened, villous behind. *Ovary* conical, densely rusty-tomentose. *Stigma* glabrous, short, with 8 small lobes. *Fruit* in cymes, depressed-globular, 1 to 1.25 in. in diam., much exceeding the minutely reticulate calyx, glabrescent, minutely tuberculate. *Seeds* compressed.

PERAK: *King's Collector* 4106, 4361, 4889, 5769, 8242, 8357; *Scortechini*; *Ridley* 3079, 10302?

The leaves of this in texture and reticulations much resemble those of *D. Toposia*, Ham. The flowers and inflorescence are, however, different from those of that species.

25. *DIOSPYROS OLEIFOLIA*, Wall. Cat. 4128 (1829). A tree; young branches twice as thick as a crow-quill, almost black when dry, sparsely pubescent. *Leaves* coriaceous, alternate; narrowly oblong to elliptic, sub-acute or acute, the base cuneate; upper surface pale olivaceous, glabrous, shining; the lower yellowish, dull, for the most part glabrous, but usually with sparse adpressed black detachable hairs near the midrib and base; main-nerves invisible on either surface; midrib strong on the lower surface, slightly depressed on the upper, length 6.5 in.; breadth 2 in.; petiole .25 in. long. *Male cymes* on axillary peduncles about .3 in. long, each bearing 3 unequally pedicellate flowers .5 in. long; all very dark in colour and with black hairs like those on the outer surface of the calyx. *Calyx* .4 in. long, tubular-campanulate, densely adpressed rusty-tomentose inside, cut half-way down into 4 triangular erect lobes. *Corolla* tubular, slightly longer than the calyx, very thick, densely tomentose like the interior of the calyx; its lobes 4, very thick, oblong, spreading slightly. *Anthers* attached near the base of the tube, 16, linear-lanceolate, sessile. *Female flowers* on longer panicles than the males; pedunculate calyx with 4 triangular acute lobes, velvety outside, tawny-tomentose inside. *Fruit* depressed-globose, 1.35 in. in diam.; the pericarp woody, glabrous when ripe, tawny-tomentose when young, the persistent *calyx* at its base thick, woody, nearly 1 in. in diam., with dark tomentum outside. A. DC. Prod. VII. 132; Kurz in Journ. As. Soc. Beng. XLI., Pt. II. 72, id. XLVI., Pt. II. 235, and For. Fl. II. 132; Hiern in Trans. Camb. Phil. Soc. XII. 204; Clarke in Hook fil. Fl. Br. Ind. III. 567.

PENANG: *Curtis* 1573. PERAK: *King's Collector* 3876; *Scortechini*. —DISTRIB. Burma, Java.

26. *DIOSPYROS BRACHIATA*, King & Gamble, n. sp. A glabrous tree

20 to 40 feet high; young branches half as thick as a goose-quill. *Leaves* alternate, coriaceous; elliptic-oblong, acute or shortly acuminate, the base slightly cuneate or rounded; upper surface pale olivaceous when dry, lower pale brown; main-nerves 10 to 12 pairs, curved, ascending, prominent like the midrib on the lower surface, depressed somewhat on the upper; length 5·5 to 9 in.; breadth 1·5 to 2·5 in.; petioles ·3 to ·5 in. *Male flowers* about ·5 in. long. *Calyx* ·2 in. long, campanulate, divided almost to the base into 5 ovate-acute erect lobes, each folded vertically along the midrib so as to form a deep dorsal groove, everywhere minutely rusty-tomentose. *Corolla* twice as long as the calyx, narrowly tubular; the tube 5-angled, externally divided, the 5 lobes twice as long as the tube, linear-oblong, contorted in æstivation, the external half of each lobe tawny-tomentose, the inner half and the whole of the anterior surface glabrous. *Stamens* 14, linear, apiculate, sub-sessile. *Female flowers* ·4 in. long, collected in compound umbellate axillary cymes 1·5 to 1·75 in. long and about as much across, the branches compressed, rusty-puberulous, spreading, bearing a few oblong obtuse bracts; flower-pedicels varying in length from ·1 to ·2 in., hibracteolate. *Calyx* fleshy, tomentose outside, deeply divided into ovate-acuminate erect grooved lobes. *Corolla* tubular, tomentose outside, glabrous inside, very thick, deeply divided into 4 oblong lobes. *Staminodes* about 8, lanceolate, flattened. *Ovary* ovoid, tapering into a short style, tomentose. *Fruit* depressed-globose, puberulous, ·75 to ·9 in diam., and about the same from below the calyx to the somewhat concave apex; *calyx* woody, thick, 1 in. wide, with triangular deeply grooved sub-acute lobes.

PENANG: *Curtis* 1453, 1454, 10230.

27. *DIOSPYROS PANICULATA*, Dalz. in Hook. Kew Journ. IV. 109 (1852). A tree 50 to 70 feet high; young branches less than half as thick as a goose-quill, rusty-puberulous. *Leaves* thinly coriaceous, alternate; elliptic or elliptic-oblong, shortly and bluntly apiculate or acuminate; the base cuneate or rounded; both surfaces pale olivaceous when dry, the reticulations minute and distinct, especially on the glabrous upper surface; main-nerves 5 to 8 pairs, curving upwards and forming arches far from the edge, bold like the midrib on the lower surface and slightly depressed on the upper; lower surface softly pubescent; length 4 to 7·5 in., breadth 1·65 to 2·5 in.; petiole ·25, stout, channelled, pubescent. *Male and female flowers* not seen. *Fruit* in lax racemoid cymes, ellipsoid, crowned by the small remains of the style, rufous-hirsute when young, ultimately glabrous, 1·5 in. long and 1 in. in diam.; the accrescent calyx at its base with 4 large broadly ovate membranous lobes with many vertical nerves and numerous distinct

minute reticulations, each lobe 1·25 long and nearly as wide. Dalz. & Gibs. Flora Bombay, 141; Bedd. Ic. Pl. Ind. Or. t. cxxv, and Fl. Sylv. Madr. cxliv; Hiern in Trans. Camb. Phil. Soc. XII. 190; Clarke in Hook. fil. Fl. Br. Ind. III. 570.

PERAK: *King's Collector* 7637, 8163.

The scanty specimens from Perak are in fruit only, but the leaves and fruit agree so well with those of *D. paniculata*—a species hitherto known only from the west of the Indian Peninsula—that, in spite of the anomalous geographical distribution, we, temporarily at least, refer the Perak specimens to that species.

28. *DIOSPYROS KUNSTLERI*, King & Gamble, n. sp. A tree 20 to 40 feet high; young branches as thick as a goose-quill, glabrous. *Leaves* alternate, large, thickly membranous; elliptic to elliptic-oblong, acute, the base rounded; both surfaces, when dry, olivaceous-brown, the lower rather darker than the upper, somewhat shining, faintly reticulate; main-nerves 8 to 12 pairs, much curved, spreading, ascending, and forming wide arches ·25 in. from the edge, prominent on the lower surface like the midrib, somewhat depressed on the upper; length 8 to 12 in., breadth 3·5 to 4·5 in.; petioles ·25 to ·35 in. *Male flowers* unknown. *Female flowers* in short axillary and extra-axillary puberulous cymes, nearly 1 in. long, pedicellate; bracts narrow, nearly as long as the pedicels, oblong. *Fruit* in short stout cymes (unripe) depressed-globular, crowned by the short remains of the style, with 4 or 5 vertical ridges, everywhere densely rusty-tomentose, subtended by the accrescent almost woody calyx, with 4 deep reniform-cordate apiculate erect undulate lobes.

PERAK: *King's Collector* 4343, 7633, 8229.

29. *DIOSPYROS NUTANS*, King & Gamble, n. sp. A shrub or small tree 8 to 16 feet high; young branches less than one-third as thick as a goose-quill, deciduously villous, the older much thicker with deeply channelled dark-coloured, sub-glabrous bark. *Leaves* alternate, thinly coriaceous; oblong or sub-oblongate-oblong, apex shortly caudate-acuminate, the base rounded; both surfaces brown when dry, the upper glabrous, the lower puberulous, but often villous on the prominent midrib; main-nerves 7 to 10 pairs, curved, ascending, interarching near the margin, the reticulations distinct; length 5 to 7 in., breadth 1·5 to 2·25 in.; petiole ·15 in. *Cymes* umbellate, few-flowered, borne on the apices of slender slightly supra-axillary flexuous puberulous peduncles much longer than the leaves (often twice as long); bracteoles few, small, lanceolate, concave. *Male flowers* in different cymes from the females, ·5 in. long, on short pedicels less than ·1 in. long. *Calyx* puberulous, campanulate, with 5 long lanceolate lobes. *Corolla* four times as long



as the calyx, narrowly tubular, slightly constricted at the throat, hairy outside, glabrous inside; the limb with 5 deep oblong lobes. *Stamens* 10, linear-elliptic, apiculate, inserted in the bottom of the tube, 5 sessile and 5 with filaments. *Female flowers* shorter than the ♂, with small filamentous staminodes. *Ovary* narrowly ovoid, densely rufous-hirsute, attenuated into a long pubescent style crowned by 5 short glabrous reflexed small stigmas. *Fruit* narrowly ellipsoid, sparsely hairy, .6 to 1 in. long and .5 in. in diam., crowned by the persistent style and subtended by the non-acrescent calyx. *Seeds* few, narrowly ellipsoid.

PERAK: *Scortechini* 674, 1678; *King's Collector* 378, 2675, 2987, 3573, 7087.

Differs from all the other Malayan species by its long peduncled pendulous inflorescence.

#### SPECIES IMPERFECTLY KNOWN.

30. *DIOSPYROS REFLEXA*, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches as thick as a goose-quill, covered with a layer of minute deciduous rusty pubescence. *Leaves* alternate, thickly coriaceous; oblong to elliptic, shortly acuminate, the base cuneate; upper surface olivaceous-brown when dry, the lower pale brown, both minutely reticulate; main-nerves 8 to 10 pairs, spreading, interarching .15 in. from the slightly recurved edges; length 5 to 7.5 in., breadth 1.75 to 3 in.; petiole .4 or .5 in. *Flowers* unknown. *Fruit* hemispheric with depressed truncate apex, under 1 in. in diam.; the calyx embracing the very base of the fruit with 4 fleshy much reflexed revolute triangular fleshy lobes, densely rusty-tomentose like the fruit.

PERAK: *King's Collector* 7676, 7747.

The curious fleshy calyx with much-reflexed lobes distinguishes this from all the other Malayan species.

31. *DIOSPYROS PENANGIANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, covered with deciduous hair of two sorts, namely, a uniform coat of minute rusty tomentum with long rusty bristle-like hairs protruding through it. *Leaves* alternate, coriaceous; oblong, shortly and bluntly acuminate, narrowed below the middle to the rather broad auriculate cordate base; upper surface when dry pale brown, shining, glabrous except the puberulous depressed midrib; lower surface reddish-brown, transversely reticulate, with pubescence like that of the young branches on the stout midrib and 10 to 14 pairs of ascending rather straight main-nerves, otherwise glabrescent; length 5.5 to 7.5 in., breadth 1.25 to 2.25 in.; petioles .15 to .2 in. long, hispid. *Male and female flowers* unknown.

*Fruit* sessile, globular, from .75 to 1 in. in diam., densely covered with minute rufous tomentum, crowned by the short remains of the style and subtended by the small calyx with 5 broad reflexed lobes.

PENANG : *Curtis* 2221.

Collected only in Penang. In leaves this resembles the Bornean plant named by Hiern *Maba? cordata*. The 5-cleft calyx of this is suggestive rather of *Diospyros* than of *Maba*.

32. *DIOSPYROS RUFa*, King & Gamble, n. sp. A tree 60 to 80 feet high; young branches about half as thick as a goose-quill or thicker, glabrous, brown and rough when dry. *Leaves* alternate, thickly coriaceous; oblong-elliptic, sometimes oblanceolate, the apex shortly and bluntly acuminate, the base much narrowed; upper surface warm brown when dry, glabrous, very shining; the lower dull, glabrous or slightly puberulous towards the base; main-nerves 7 to 10 pairs, spreading, little curved, interarching near the slightly incurved edges, slightly prominent on the lower surface and somewhat depressed on the upper when dry; length 5.5 to 7.5 in., breadth 1.75 to 2.25 in.; petioles .4 to .6 in., stout, channelled. *Male and female flowers* unknown. *Fruit* globular-ovoid, blunt, 1.25 to 1.5 in. long and about 1.15 in. in diam., densely rusty-tomentose. *Calyx* at base flat, 4-angled, .4 in. in diam., rusty-tomentose.

PERAK : *King's Collector* 3330, 4945, 5409, 6712.

33. *DIOSPYROS AREOLATA*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches thinner than a goose-quill, rusty-puberulous becoming glabrous. *Leaves* alternate, very coriaceous; oblong, sub-acute, the base rounded; both surfaces glabrous except the puberulous midrib and sometimes the main-nerves, hepatic-brown when dry; the upper shining, minutely and faintly areolate; the lower dull and boldly areolar-reticulate; midrib bold on the lower surface, slightly depressed on the upper; main-nerves about 7 pairs, curved, ascending abruptly, faint on the lower surface, almost invisible on the upper; length 4.5 to 6 in.; breadth 1.5 to 1.75 in.; petioles .5 or .6 in. *Male flowers* (only buds seen) under .5 in. in length, collected near the ends of the branches in tomentose cymes .5 to 1 in. long. *Calyx* coriaceous, on a thick pedicel shorter than itself, ovoid in bud; the mouth with triangular short teeth. *Corolla* like the calyx, but glabrous and fleshy. *Stamens* about 21; anthers linear, apiculate, nearly uniform, sub-sessile or on short broad flat filaments, sometimes slightly attached in groups of 3. *Female flower* probably solitary, much broader than the ♂. *Calyx* velvety outside and inside, divided nearly to the base into 4 ovate-triangular very acute lobes .4 in. long. *Corolla* fleshy, glabrous, .6 in. long, its

tube wide with staminodes like the anthers of the ♂ but not so numerous; limb about as long as the tube, with 4 deep, broad, sub-quadrate spreading lobes. *Ovary* ovoid-conic, densely rusty-pilose. *Stigmas* 4, oblong, fleshy, glabrous. *Fruit* unknown.

PERAK: *Scortechini* 476; *King's Collector* 5813.

34. *Diospyros curtisii*, King & Gamble, n. sp. A tree (?); young branches rather thicker than a goose-quill, rugulose and dark-coloured when dry, glabrous. *Leaves* alternate, thinly membranous; oblong or oblong-elliptic, shortly and bluntly acuminate, base rounded or slightly cuneate; both surfaces glabrous, the upper olivaceous when dry, the lower brown; main-nerves 7 to 9 pairs, slightly curved, ascending, faint on both surfaces; the midrib prominent on the lower surface, slightly so on the upper; length 2·5 to 5 in., breadth 1·25 to 2 in.; petioles ·2 in. *Male flowers* not seen. *Female flowers* ·25 in. long, in extra-axillary or axillary fascicles of about 3 on the younger branches; pedicels about ·2 in. long, cinerous-pubescent, each with 2 oblong obtuse bracteoles at its base, about ·5 in. long. *Calyx* coriaceous, nearly ·2 in. broad at the base, deeply divided into 4 triangular-reniform glabrescent lobes. *Corolla* partially glabrous, about as long as the calyx, salver-shaped; tube short; limb divided into 4 deep, broadly ovate, spreading lobes. *Staminodes* about 4, linear-lanceolate, compressed. *Ovary* narrowly oblong, tapering into the short thick style, densely tawny-tomentose. *Fruit* unknown.

PULAU POONGAH: *Curtis* 2942.

35. *Diospyros glomerulata*, King & Gamble, n. sp. A tree 40 to 60 feet high; young branches rather thicker than a crow-quill, densely clothed with minute rufous pubescence. *Leaves* membranous, alternate; elliptic, shortly and bluntly apiculate, the base rounded or slightly cuneate; upper surface olivaceous when dry, glabrous; the lower brown, puberulous, midrib bold; main-nerves 5 or 6 pairs, slightly curved, ascending; length 2·25 to 3·5 in., breadth 1·25 to 1·75 in.; petiole about ·1 in. *Male flowers* ·2 in. long, crowded in dense sessile axillary and extra-axillary globular capitules ·4 in. across. *Calyx* sessile, campanulate, tomentose, deeply divided into 4 broadly triangular sub-acute erect lobes. *Corolla* tubular, tetragonous, thick, about as long as the calyx; tube glabrous, the 4 lobes pubescent outside, oblong. *Stamens* 8, separate. *Anthers* broadly lanceolate, apiculate, filaments short. *Female flowers* and *fruit* not known.

PERAK: *King's Collector* 8590.

The following description of a *Diospyros* from Pahang is taken from Ridley's account of the Flora of the Eastern Coast of the Malay Peninsula.

36. *DIOSPYROS CALIGINOSA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 318 (1893). A graceful lofty tree; bark black; branches pubescent. *Leaves* alternate, elliptic-oblong, acute; 8 in. long, 3 in. broad; main-nerve 13 pairs; glabrous above, minutely pubescent beneath on the midrib and nerves; petiole .25 in. long, minutely pubescent. *Flowers* on old wood, fascicled; peduncles short, covered with a black pubescence. *Calyx* of ♂ flower patelliform; sepals 4, broadly ovate, obtuse, covered without and on the margin with black hair. *Corolla* urceolate, white, silky, .5 in. long; lobes 4, short, ovate, recurved. *Stamens* 16, collected in pairs; filaments thick, minutely hispid; anthers glabrous, long-conical with acute tips. *Ovary* abortive, 4-lobed, irregular, the lobes furrowed; style conical. Flowers of ♀ not seen. *Fruit* small, globose, surrounded by the accrescent sepals.

PAHANG: in thick woods at Kota Glanggi and Kwala Tembeling, Ridley.

We are unable, having seen no specimen, to make quite sure of the place of this species. It seems to come very near to No. 17 *D. tristis*, King & Gamble.

### Order LXXIII. STYRACEÆ.

Trees or shrubs. *Leaves* alternate, simple; stipules none. *Flowers* in simple or branched axillary or terminal racemes or spikes, sometimes solitary; usually white, rarely red; bracts small, often minute or obsolete. *Calyx* gamosepalous, the tube more or less adnate to the ovary, so that it may be superior or inferior; limb 4-5-toothed or truncate, persistent. *Corolla* of 4 to 5 petals, the tube usually short, sometimes none; petals imbricate or sometimes valvate or contorted. *Stamens* adnate to the petals, equal in number to them or double or very many; 1-many-seriate; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2-5-celled or sometimes, by the separation of the septa, 1-celled; style filiform, sometimes thick; stigma capitate, entire or lobed; ovules 1 or more, on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, indehiscent, 1-, rarely 2-3-seeded. *Seeds* albuminous, testa thin or coriaceous, hilum generally broad; embryo straight or curved, cotyledons terete or flattened; radicle cylindrical or short.—DISTRIB. Warmer regions of Asia, Australia, and America, absent from Africa; genera 7 or 8, species about 350.

Stamens many, in several series .. .. .	1. SYMPLOCOS.
Stamens 10, in one series .. .. .	2. STYRAX.

1. SYMPLOCOS, Linn.

Trees or shrubs. *Leaves* alternate, often turning yellow when dry, entire or toothed. *Flowers* white, sometimes red, in axillary simple or compound spikes or racemes, sometimes in few-flowered fascicles, occasionally reduced to one flower; bracts small, solitary at the base of the pedicels; bracteoles 1 to 3, small, at the base of the flower. *Calyx-tube* adnate, short when in flower, campanulate, often enlarged in fruit; lobes 5, imbricate. *Petals* 5 in one series, or 6 to 10 in two series, free or somewhat connate, or sometimes connate in a tube, imbricate. *Stamens* adnate to the corolla, at the base of the petals or higher up the tube, numerous, many-seriate, the outer the longest; filaments filiform, or sometimes flattened; anthers short, dehiscing in longitudinal parallel cells. *Ovary* inferior, or semi-superior, 2-5-celled; style filiform; stigmas capitate, slightly lobed; ovules 2, pendulous from the inner angle of each cell. *Fruit* an oblong, ovoid or sub-globose drupe; endocarp woody or thin, often ridged or ribbed, 1-3-seeded. *Seeds* usually 1 only (by abortion); embryo terete, straight or curved, in the centre of fleshy albumen; cotyledons much shorter than the radicle.—  
DISTRIB. Warmer regions of Asia, Australia and America, species about 290 to 300.

Filaments more or less pentadelphous; corolla-tube divided nearly to the base (Subg. I. HOPEA):—

Fruit (where known) more or less ampulliform; embryo curved (Sect. i. PALURA):—

Inflorescence compound, branching at any rate at the base:—

Branches of the inflorescence paniculately racemose, drupe nearly .5 in. long .. .. 1. *S. odoratissima*.

Branches of the inflorescence racemose:—

Racemes densely ferruginous-tomentose; pedicels scarcely .05 in. long, thick .. .. 2. *S. fulvosa*.

Racemes ferruginous-villous; pedicels .2 in. long, slender; leaves elliptic, under 4 in. long .. .. 3. *S. nivea*.

Racemes pulverulent; pedicels .2 in. long, slender; leaves obovate .. .. 4. *S. pulverulenta*.

Racemes glabrous or slightly pubescent; pedicels longer than .05 in., slender:—

Leaves over 4 in. long and 2 in. broad; calyx-lobes glabrous .. .. 5. *S. monticola*.

Leaves under 4 in. long and 1.5 in. broad; calyx-lobes pubescent .. .. 6. *S. fasciculata*.

Branches of the inflorescence spicate:—

Leaves beneath and inflorescence glabrous or nearly so; { 7. *S. spicata*.  
endocarp of seed thin .. .. var. *malasica*.

Leaves beneath and inflorescence ferruginous-villous; endocarp of seed hard, bony .. .. 8. *S. ferruginea*.

- Inflorescence simple, racemose; racemes very short, almost reduced to fascicles .. .. 9. *S. Ridleyi*.
- Fruit (where known) ovoid-oblong, not ampulliform; embryo straight (Sect. ii. *LODHERA*):—
- Inflorescence paniculate, branching usually from the base only:—
- Branches of the inflorescence racemose, more than .5 in. long:—
- Leaves glabrous or nearly so; fruit glabrous:—
- Leaf-margins prominently broad-crenate, apex shortly and bluntly acuminate .. 10. *S. celastriifolia*.
- Leaf-margins obscurely crenate or entire:—
- Leaf-margins prominently glandular, texture almost coriaceous .. 11. *S. adenophylla*.
- Leaf-margins not glandular, texture chartaceous.. 12. *S. perakensis*.
- Leaves very hairy; fruit villous .. 13. *S. Brandiana*.
- Branches of the inflorescence racemose, under .5 in. long; leaf-margins entire or nearly so .. 14. *S. concolor*.
- Inflorescence unbranched:—
- Inflorescence racemose:—
- Racemes 2 to 3 in. long, slender, few-flowered .. 15. *S. calycodactylos*.
- Racemes very short:—
- Leaves coriaceous, acute or rounded or emarginate at apex; fruit ovoid-oblong, under .5 in. long .. 16. *S. ophirensis*.
- Leaves chartaceous, long-acuminate at apex, cuneate at base; fruit cylindric-oblong, over .5 in. long .. 17. *S. Curtisii*.
- Leaves chartaceous; fruit not known:—
- Leaves 6 to 7 in. long, abruptly acuminate at apex, usually sub-cordate at base, quite glabrous .. 18. *S. crassipes*.
- Leaves 4 to 7 in. long, long acuminate at apex, rounded at base, ferruginous-pilose beneath .. 19. *S. penangiana*.
- Inflorescence spicate:—
- Drupes large, over 1 in. in length; endocarp with 8 prominent sharp ridges; leaves nearly glabrous:—
- Leaves usually under 6 in. long and 2 in. broad; young inflorescence without prominent bracts .. 20. *S. cerasifolia*.
- Leaves usually over 6 in. long and 2 in. broad; young inflorescence prominently bracteate so as to appear strobilate .. 21. *S. rigida*.
- Drupes small, under .5 in. long; endocarp with faint ridges only; leaves rusty-pubescent beneath; young inflorescence strobilate .. 22. *S. rubiginosa*.
- Filaments connate in a staminal tube; corolla-tube elongate (Subg. II. *CORDYLOBLASTE*):—
- Corolla-tube scarcely .3 in. long .. 23. *S. confusa*.
- Corolla-tube about 1 in. long:—
- Inflorescence densely rusty-tomentose; leaves pubescent beneath .. 24. *S. Maingayi*.
- Inflorescence slightly grey-pubescent; leaves glabrous .. 25. *S. Scortechinii*.

Subgenus I.—HOPEA.

1. SYMPLOCOS ODORATISSIMA, Choisy ex Zoll. Syst. Verz. 136 (1854).  
A tree with spreading branches reaching 60 to 70 feet in height and 18 to 24 in. in diam. of stem; branches grey, stout; branchlets dark greyish-brown, angled, striate, minutely puberulous; leaf-buds acuminate, .15 in. long. *Leaves* thinly coriaceous; elliptic or elliptic-obovate or elliptic-oblong, shortly acuminate at apex, cuneate or slightly rounded at base; glabrous on both surfaces; margin entire or serrate, blackish-brown when dry; 3 to 6 in. long, 2 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 8 to 10 pairs, arching upwards to and along the margin where they meet in an intramarginal looped nerve near it; reticulations transverse, not prominent; petiole .4 to .6 in. long, flattened above. *Inflorescence* of grey-pubescent panicles, 1.5 to 2 in. long, axillary to the upper leaves, longer in fruit and stouter; branches paniculately racemose; bracts very small, deciduous; bracteoles 2, below the calyx-tube, ovate-acute, reflexed, .05 in. long; pedicels .15 in. long. *Calyx-tube* .05 in. long, pubescent; lobes 5, as long as tube, rounded. *Corolla-tube* very short; lobes ovate-obtuse, .15 in. long, pubescent on back, ciliate, white. *Stamens* in 5 bundles opposite corolla-lobes, very many, 80 to 100 in all; filaments slender; anthers rounded. *Ovary* villous; style thick, .075 in. long, stigma lobed; cells 3, ovules 2 in each cell. *Fruit* an ampulliform drupe, .4 to .5 in. long, .25 in. broad, lower part rounded, upper cylindrical, crowned by the calyx-rim and connivent lobes, the calyx-rim .075 in. broad; exocarp corky, rusty-brown, slightly pubescent; endocarp hard. *Seeds* 1 to 3, usually 1 only perfect; testa membranous, albumen fleshy; embryo slightly curved, .15 in. long, radicle long. Miq. Fl. Ind. Bat. I. Pt. 2, 468; Koord. & Val. Bijdr. VII. 148; Brand Monog. Sympl. 35. *Dicalyx odoratissimus*, Blume Bijdr. 1116.

PERAK: *King's Collector* 10030, 10411, 10777. SINGAPORE: *Ridley* 4428 (this latter specimen has leaves up to 8 in. long and 3.5 in. broad).—DISTRIB. Sumatra (*Beccari* 834), Java, Borneo (*Beccari* 4014).

This is var. *divaricata*, Brand, which seems to us hardly separable, unless by the leaves being almost entire. In the Java and Sumatra specimens of *G. odoratissima* the leaves are markedly serrate.

2. SYMPLOCOS FULVOSA, King & Gamble, n. sp. A very large tree, reaching 150 feet in height (Scortechini); branchlets dark-brown, young ones and innovations densely ferruginous-tomentose. *Leaves* chartaceo-coriaceous; elliptic, abruptly long blunt-acuminate at apex the acumen often curved, cuneate or attenuate at base; glabrous and shining above,

glabrous and dull beneath, ferruginous-brown when dry; margins faintly crenate-serrate, with a row of glands, slightly recurved; 3 to 4.5 in. long, 1.25 to 2 in. broad; midrib slender, slightly impressed above; main-nerves 6 to 8 pairs, the lowest pair close to the margin, the rest gradually more distant upwards, curved upwards to and along the margin where they meet in a looped intramarginal nerve; reticulations many, forming an elegant network; petiole .75 in. long. *Inflorescence* of tripartite sessile panicles of racemes, the racemes 1 to 2 in. long, densely ferruginous-tomentose; bracts and bracteoles minute, hidden in the tomentum; pedicels thick, .05 in. long; flowers white, then yellowish. *Calyx-tube* short; lobes very short, rounded, densely tomentose without. *Corolla-tube* short; lobes ovate-oblong, glabrous, .15 in. long, 3-5-nerved. *Stamens* many, obscurely separated in bundles; filaments slender; anthers very small rounded. *Ovary* and disk glabrous, style glabrous, .075 in. long, stigma capitate; cells 3. *Fruit* unknown.

PERAK: *Scortechini* 563, 567.

3. *SYMPLOCOS NIVEA*, Brand Monog. Sympl. 36 (1901). A tree, reaching 50 to 60 feet in height; branchlets slender, rounded, dark brown, glabrous; leaf-buds ovate-acuminate, tawny-pubescent. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, acute or acuminate at apex, cuneate at base; glabrous and shining above, glabrous and pale beneath, dark olive-brown when dry; margins obscurely undulate-crenate, recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib slender, impressed above; main-nerves 5 to 6 pairs, irregularly spaced and often branched, at first straight then curved upwards to and along the margin where they anastomose in a looped intramarginal nerve; reticulations obscure; petiole slender, .3 to .4 in. long. *Inflorescence* an axillary panicle of villous racemes 2 to 3 in. long, the racemes 12-15-flowered; bracts and bracteoles ovate-lanceolate, villous, quickly caducous; pedicels slender, .2 in. long. *Calyx-tube* adnate to the ovary; lobes 5, oblong-obtuse, .1 in. long, glabrous, persistent. *Corolla* pure white; lobes twice as long as those of the calyx. *Stamens* about 60, as long as the corolla. *Ovary* glabrous, 1-celled, ovules apparently 2; style slender from a conical villous base. *Fruit* unknown.

PENANG: at Pulau Boetong, Government Hill and Muka Head, *Curtis* 715.

4. *SYMPLOCOS PULVERULENTA*, King & Gamble, n. sp. A tree (?); ultimate branchlets and inflorescence grey- or golden-pulverulent-scaly; leaf-buds lanceolate-acuminate. *Leaves* membranous; obovate, abruptly short acuminate at apex, cuneate often unequally at base; glabrous on both surfaces except on the nerves, olive-green when dry; margins



entire; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, impressed above; main-nerves 8 to 9 pairs, curving upwards to and along the margin; reticulations transverse, prominent and slightly raised above; petiole .7 to .8 in. long, smooth, pulverulent-pubescent. *Inflorescence* of axillary panicles of racemes about 2 in. long; main rachis .7 in. long; branches sub-opposite, about 2 pairs, .5 to 1 in. long; bracts short, ovate, caducous; bracteoles 2, ovate-acute, under the calyx-tube; pedicels slender, .15 to 2 in. long; flowers yellow, buds globose. *Calyx-tube* funnel-shaped, .06 in. long; lobes 5, short, rounded. *Corolla-tube* short; lobes 5, ovate, obtuse, pulverulent-pubescent. *Stamens* very numerous, probably 200 at least, in 5 bundles opposite the corolla-lobes; filaments slender; anthers very small, rounded. *Ovary* and disk pubescent; style stout, stigma capitate; cells 2, ovules several. *Fruit* not known.

SINGAPORE: at Chanchukam, *Ridley* 4786.

5. *SYMPLOCOS MONTICOLA*, King & Gamble, n. sp. A shrub or small tree reaching 20 feet in height and 3 in. in diam. of stem; branchlets somewhat slender, pale brown, sinuous; leaf-buds small, acuminate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces, greenish-brown when dry; margins serrate except near the base, slightly recurved; 4 to 6 in. long, 2 to 2.5 in. broad; midrib slender, pale, impressed above; main-nerves 6 to 8 pairs, close near the base, gradually more distant, curved upwards to meet in a looped intramarginal nerve; secondary nerves few, reticulations transverse; petiole .25 in. long, channelled above. *Inflorescence* a fascicle of racemes either from the axils of leaves a little below the last, or from the new wood below them; racemes .5 to 1.5 in. long, 6-8-flowered, all parts nearly glabrous; bracts ovate, very minute; pedicels 0 to .1 in. long; bracteoles 2, ovate, acute, ciliate, .05 in. long, at the base of the calyx-tube. *Calyx-tube* short; lobes as long (.1 in.), thin, glabrous, round. *Corolla-tube* very short; lobes 5, thin, oblong, obtuse, .2 in. long, 3-nerved. *Stamens* many, more than 80, in 5 bundles opposite the corolla-lobes; filaments slender; anthers rounded. *Ovary* and disk glabrous or slightly pubescent; style short, .1 in. long; stigma capitate; cells 3. *Fruit* not known.

PERAK: *Scortechini* 533; *King's Collector* 3804, 6927, in dense jungle on the summits of mountains at 4,000 to 4,600 feet.

6. *SYMPLOCOS FASCICULATA*, Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 40 to 50 feet in height and 10 to 15 in. in diam. of stem; branchlets pale greyish-brown, slender, innovations greyish-pubescent. *Leaves* thinly chartaceous or membranous; oblong-lanceolate, long acuminate at apex, the acumen curved and mucro-

nate, rounded or obtusely rhomboid at base; glabrous and shining above, glabrous beneath except on the midrib, yellowish when dry; margins entire or obscurely and distantly serrate, slightly recurved; 2 to 4 in. long, .7 to 1.5 in. broad; midrib slender, impressed above, minutely pilose beneath; main-nerves about 5 to 7 pairs, indistinct, curved upwards and meeting in an intramarginal looped nerve rather distant from the margin; secondary nerves and reticulations slender, obscure; petiole .2 in. long, bordered above by the decurrent margin of the blade and minutely pilose. *Inflorescence* a short fascicle of axillary cymes or racemes .5 to .7 in. long, ashy-pubescent; bracts very minute; pedicels slender, .15 in. long; bracteoles 3, minute, ovate, acute, ciliate. *Calyx-lobes* 5, rounded, obtuse, .05 in. long, pubescent without. *Corolla-lobes* oblong, obtuse, .1 to .15 in. long, glabrous, 5-nerved; tube very short or almost none. *Stamens* in 5 bundles opposite the corolla-lobes, about 20 to 25 or sometimes more; filaments slender, outer ones exsert; anthers minute, rounded, emarginate. *Ovary* depressed at top, disk glabrous, cells 3; style slender, .075 in. long, ending in a flattened 3-lobed stigma. *Fruit* an ampulliform drupe, ovoid below for .2 in. in length, .15 in. in diam., glabrous, 5-6-ribbed, tipped by a cylindric beak .05 in. long and by the persistent calyx-lobes; exocarp thin, endocarp hard, furrowed, furnished within with 3 to 6 strong ribs, enclosing a much-lobed seed; testa thin; albumen fleshy; embryo very slightly curved, .15 in. long. Miq. Fl. Ind. Bat. I. Pt. 2. 467; Clarke in Hook. f. Fl. Br. Ind. III. 574; Koord. & Val. Bijdr. 7. 150; Brand Monog. Sympl. 34. *Dicalyx tinctorius*, Bl. Bijdr. 1116.

PENANG: *Curtis* 3171. PERAK: *Wray* 1865, 2418, 2466, 2739, 3561; *Scortechini* 128, 1527; *King's Collector* 1042, 2021, 3003, 4739, 5175, 5337, 10525. SELANGOR: *Ridley* 8209. MALACCA: *Maingay* (K.D.) 958; *Griffith* (K.D.) 3665; *Holmberg* 867. JOHORE: *G. King*. SINGAPORE: *Murton* 143; *Ridley* 3626A, 8209.—DISTRIB. Sumatra (*Forbes* 2355, 2358, 2563, 2812); Java (*Forbes* 218); Borneo (*Beccari* 2380; *Haviland* 1024, 1545).

After a great deal of trouble the seed with albumen and embryo were separated. The walls of the shell of the fruit are furnished inside with projecting ribs, so that the seed resembles that of a small walnut and the embryo is slightly curved, long and narrow, and might be called straight. Koorders & Valetton's description is thus confirmed.

7. SYMPLOCOS SPICATA, Roxb. Hort. Beng. 40 (1814), and Fl. Ind. II. 541; Wall. Cat. 4417; A.D.C. Prod. VIII. 254; Wight Ill. t. 150; Miq. Fl. Ind. Bat. I. Pt. 2. 465; Bedd. Fl. Sylv. Madr. cxlix; Brandis For. Fl. 300; Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 and For. Fl. II. 146; Clarke in Hook. f. Fl. Br. Ind. III. 573; Trimen Fl. Ceyl. III. 104;

Cooke Fl. Bomb. II. 108; Koord. & Val. Bijdr. VII. 144. *S. polycarpa*, Wall. Cat. 4423; DC. l.c. 255; Kurz ll.c. *S. Loha*, Don Prod. 144; DC. l.c. 255. *S. racemosa*, Wall. Cat. 4418 (*in part, not of Roxb.*).

**VAR. *malasica***, Clarke in Hook. f. Fl. Br. Ind. III. 573. A small tree with spreading branches, reaching 30 to 40 feet in height and 1 foot in diam. of stem; branchlets dark grey-brown, smooth, innovations glabrous; buds lanceolate acuminate. *Leaves* coriaceous-chartaceous, alternate; elliptic- or oblong-lanceolate, acute or acuminate at apex, cuneate at base; entire or serrate, glabrous on both surfaces, turning yellow when dry; margin distantly and slightly denticulate, glandular; 4 to 7 in. long, 1·5 to 2·5 in. broad; midrib thick, impressed above; main-nerves about 10 pairs, irregular, curved upwards and branching towards the margin; secondary nerves few; reticulations prominent on the under surface; petiole 4 to 7 in. long, channelled above. *Inflorescence* an axillary panicle of spikes, the branches mostly near the base; spikes 1·5 to 4 in. long, glabrous or slightly pubescent; bracts very small, deciduous; bracteoles under each flower 3, ovate, acute or obtuse, ciliate, 0·5 in. long. *Calyx-lobes* 5, rounded, imbricate, glabrous, tube as long as lobes, the latter 0·5 in. long. *Corolla* 5-lobed, white or yellowish; tube very short; lobes ovate-orbicular, 1 to 1·5 in. long. *Stamens* indefinite, about 40, the outer ones longer than the petals, inserted on the corolla-tube; filaments slender; anthers short, rounded. *Ovary* inferior, 3-celled; ovules 3 to 4 in each cell; style thick, 1 in. long, stigma capitate. *Fruit* a globose drupe 1·5 to 2 in. long, surmounted by a rim formed by the short calyx-lobes, smooth, olive-coloured, exocarp and endocarp thin, ribbed. *Seed* 1, testa thin, albumen rather scanty; embryo curved.

**PERAK:** *Wray* 2798; *Scortechini*; *King's Collector* 6299, 6903. **MALACCA:** *Griffith*; *Maingay* (K.D.) 957; *Derry* 506.

**VAR. *acuminata***, Brand Monog. Sympl. 40. *Leaves* long acuminate, blunt at the tip, serrulate, 3 to 5 in. long, 1 to 2 in. broad; main-nerves 7 to 8 pairs, all nerves and reticulations, except the impressed midrib, prominent on the upper surface in young leaves. *Flowers* sometimes pedicellate. *Fruit* somewhat urceolate, ribbed. *Symplocos acuminata*, Miq. Fl. Ind. Bat. I. Pt. 2. 467. *Dicalyx acuminatus*, Bl. Bijdr. 1119.

**PERAK:** *Scortechini* 1556. — **DISTRIB.** Java, Sumatra (*Forbes* 3208).

**VAR. *attenuata***, Clarke in Hook. f. Fl. Br. Ind. III. 573. *Leaves* long acuminate at apex, long attenuate at base, 3 to 4 in. long, 1 to 1·25 in. broad; margins serrate. Spicate branches of the inflorescence slender, usually short. *Fruit* small, often only 1 to 1·5 in. in diam.

*S. attenuata*, Wall. Cat. 4426; A. DC. Prod. VIII. 256; Brand Monog. Sympl. 39.

KEDAH: *King's Collector* 1764.—DISTRIB. Assam, Burma.

8. SYMPLOCOS FERRUGINEA, Roxb. Hort. Beng. 40 (1814), Fl. Ind. II. 542. A tree with spreading branches reaching 50 to 60 feet in height and 1 foot in diam. of stem; branchlets stout, dark brown, smooth, innovations densely ferruginous-villous. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, cuneate at base; glabrous and shining above, ferruginous-villous especially on the nerves beneath, turning yellow when dry; margins serrulate, denticulate or almost entire, recurved; 5 to 8 in. long, 1·5 to 3 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 12 to 14 pairs, prominent beneath, parallel at first and straight for some distance then arching near the margin; secondary nerves few; reticulations obliquely transverse, not prominent; petiole 3 to 5 in. long, densely rusty-villous, thick. *Inflorescence* an axillary panicle of spikes, 2 to 6 in. long, the spikes and panicle short in bud, longer in flower, much elongated in fruit, the branches of the panicle mostly near the base, densely ferruginous-villous; bracts very small, ovate-acute, villous; bracteoles under each flower 3, the central one 12 in. long, ovate-acuminate, the two outer shorter, ovate-acute, the three together as long as the calyx. *Calyx* 5-lobed; lobes ovate-obtuse, 1 in. long, pubescent without. *Corolla* 5-lobed, white, rotate; tube 0·5 in. long; lobes 1 in. long, oblong-obtuse, 3-nerved. *Stamens* indefinite, 40 to 70, in 5 fascicles inserted on the corolla-tube; filaments slender, gradually increasing in length from the inside outwards, the outer ones a little longer than the petals; anthers rounded, short. *Ovary* depressed, disk glabrous; cells 3; style thick, 1 to 2 in. long, stigma 3-lobed; ovules several in each cell. *Fruit* a globose or ampulliform drupe, faintly ribbed, 15 to 2 in. long, surmounted by the persistent calyx with enlarged connivent teeth; exocarp thin; endocarp very hard, bony, about 12-14-ribbed, globose below, cylindric and very short above. *Seed* 1, testa thin, albumen rather scanty; embryo curved, 1 to 15 in. long. Wall. Cat. 4412; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 574 (*var. exc.*); Koord. & Val. Bijdr. VII. 141; Brand Monog. Sympl. 40. *S. mollis*, Wall. Cat. 4433; G. Don Gen. Syst. IV. 3. *S. Verhuelii*, Jungh. & de Vriese Pl. Nov. Ind. Or. 12; Miq. l.c. 467. *S. javanica*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 (*syn. S. rubiginosa exc.*) and For. Fl. II. 145. *S. lachnobotrya*, and *S. Horsfieldiana*, Miq. Fl. Ind. Bat. Suppl. 475. *Dicalyx javanicus*, Blume Bijdr. 1117.

PENANG: *Wallich* 4433; *Phillips*; *Curtis* 206; *King's Collector*

1353. PERAK: *Wray* 3387; *Scortechini* 900; *King's Collector* 925, 4376, 4395, 4683, 5235, 6219, 7091, 8646, 11019. PAHANG: *Ridley* in *Trans. Linn. Soc. Ser. 2, III.* 318. MALACCA: *Maingay* (K.D.) 956.—  
DISTRIB. Assam, Burma, Java (*Forbes* 682, 798, 861, 1203), Sumatra (*Forbes* 2614, 2691, 3150; *Beccari* 842), the Moluccas, the Philippines, and S. China.

The leaves in this species are very variable; for instance, those of *King's Collector* Nos. 4395, 4683 have oblong-lanceolate leaves 6 to 8 in. long and about 2 in. broad, with more distant nerves, and are nearly glabrous beneath; but some of the leaves approach very nearly to those of other specimens, and we cannot therefore separate it as a variety. The marked elongation of the fruiting inflorescence is another source of difficulty in superficial identification.

9. *SYMPLOCOS RIDLEYI*, King & Gamble, n. sp. A medium-sized tree; branchlets glabrous, angled, striate; leaf-buds acuminate, glabrous. *Leaves* coriaceous; ovate or oblong, acuminate at apex, attenuate at base; glabrous on both surfaces, shining above, greenish-yellow when dry; margins entire or remotely and faintly denticulate, recurved; 3 to 4 in. long, 1 to 1.5 in. broad; midrib slender, raised above; main-nerves 8 to 9 pairs, raised on both surfaces, straight, meeting in a looped intra-marginal nerve; secondary nerves few; reticulations prominent, raised above; petiole .3 in. long, channelled above. *Inflorescence* of sessile or very short few-flowered axillary racemes, as long as the petiole; rachis silky-pubescent; bracts and bracteoles orbicular, ciliate, pubescent; pedicels none or very short. *Calyx-lobes* orbicular, thin, ciliate, .1 in. broad, concave; tube very short. *Corolla-tube* very short, lobes ovate, .12 to .15 in. long, 3-5-nerved, white. *Stamens* about 50, in bundles opposite the corolla-lobes; filaments slender, the outer ones a little longer than the corolla-lobes; anthers rounded. *Ovary* villous, 3-celled, ovules 2 in each cell; disk glabrous; style thick, .1 in. long, stigma capitate, lobed. *Fruit* not known.

SINGAPORE: *Ridley* 5684.

A species very closely allied to *S. phylloclayx*, Clarke, of N. India and China, and to *S. japonica*, A. DC. of Japan.

10. *SYMPLOCOS CELASTRIFOLIA*, Griff. MS.; Clarke in Hook. f. Fl. Br. Ind. III. 575 (1882). A tree (?); branchlets smooth, slender, glabrous. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and bluntly acuminate at apex, cuneate at base; glabrous on both surfaces, greenish-brown above, yellowish beneath when dry; margins crenate, slightly recurved; 2.5 to 5 in. long, 1.5 to 2.25 in. broad; midrib slender, impressed above; main-nerves 6 to 8 pairs, irregular, not prominent, at first straight, then curving upwards and branching to meet

near the margin in an intramarginal network; reticulations obscure; petiole .2 to .3 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a few- and basally-branched pubescent panicle of long slender racemes, 2.5 to 3 in. long; racemes 12-16-flowered; pedicels .1 in. long; bracteoles 2, lanceolate, .05 in. long, ciliate, pubescent. *Calyx*-tube .05 in. long; lobes 5, oblong, obtuse, .075 in. long. *Corolla* white, sweet-scented; tube very short; lobes ovate-oblong, .2 in. long. *Stamens* in 5 bundles opposite the corolla-lobes, 40 to 70, the outermost the longest and equal to the corolla-lobes. *Ovary* depressed, disk glabrous; cells 3; style .125 in. long, stigma capitate. *Fruit* an ovoid-ellipsoid drupe, .25 in. long, smooth, tipped with the rim and erect teeth of the persistent calyx. *Seeds* 1 to 3, testa membranous; embryo slender, straight, .1 in. long. Brand Monog. Sympl. 48.

PENANG: *Curtis* 3459. MALACCA: *Griffith* (K.D.) 3651.—DISTRIB. Borneo (*Teymann*, *Motley*, *Beccari* 2374, *Haviland* 509B, 1642, 3706).

11. SYMPLOCOS ADENOPHYLLA, Wall. Cat. 4427 (1829). A tree reaching 50 to 60 feet in height, stem 15 to 20 in. in diam.; branchlets dark brown, smooth, upper parts and innovations dark rusty-glandular-pubescent. *Leaves* chartaceo-coriaceous; narrowly lanceolate to elliptic-lanceolate and elliptic; obtusely long caudate-acuminate at apex, cuneate or attenuate at base; glabrous on both surfaces, shining or not, olive-brown or dark reddish-brown when dry; margins crenate or subentire, the crenatures with large glands, sometimes recurved; 3 to 5 in. long, .7 to 1.5 in. broad; midrib slender, impressed above; main-nerves 5 to 8 pairs, distant, arching upwards to join in a looped intramarginal nerve at about two-thirds of the distance to the margin; secondary nerves and reticulations obscure; petiole .3 to .5 in. long, often bent. *Inflorescence* a 3- and basally-branched axillary panicle of racemes, glandular-rusty-pubescent, 1 to 2 in. long, racemes about 12-flowered; bracts ovate-acute, caducous; pedicels .05 to .1 in. long; bracteoles minute, thin, obtuse. *Calyx*-tube glabrous or minutely pubescent, .05 in. long; its teeth very minute, triangular or rounded, rusty-pubescent. *Corolla* yellowish-white, tube short; lobes oblong, rounded, about .15 in. long, incurved at tip. *Stamens* 40 to 50, in 5 bundles opposite the corolla-lobes, outer ones as long as those lobes; filaments slender; anthers small, rounded. *Ovary* depressed, disk glabrous, cells 3; style slender, .1 in. long; stigma capitate. *Fruit* an oblong-cylindrical or ellipsoid drupe .3 to .35 in. long and half as broad, smooth, pale yellowish-brown, crowned with the minute, inconspicuous, much-incurved, persistent calyx-teeth; exocarp smooth, thin; endocarp bony, ribbed. *Seed* 1; embryo straight, pendulous. G. Don Gen. Syst. IV. 3; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2, 466;

Clarke in Hook. f. Fl. Br. Ind. III. 575; Brand Monog. Sympl. 48; Stapf in Trans. Linn. Soc. 2nd Ser. IV. 204. *S. iteophylla*, Miq. Fl. Ind. Bat. Suppl. 476; Brand l.c. *S. bancana*, Miq. l.c.

KEDAH: *Ridley* 5533. PENANG: *Wallich* 4427A; *Maingay* (K.D.) 959; *Curtis* 402, 445. PERAK: *Wray* 1119, 3842, 3925, 4123; *Scortechini* 490; *King's Collector* 1269, 2606, 6873. SELANGOR: *Ridley* 7553, 8549. MALACCA: *Griffith* (K.D.) 3649. SINGAPORE: *Wallich* 4427B; *G. Thomson*; *Hullett* 828; *Walker* 255; *Ridley* 3635A, 3809.—DISTRIB. Sumatra (*Beccari* 147); Bangka (*Horsfield* 39); Borneo (*Beccari* 2115, *Lobb*, *Haviland* 1187).

A variable species as regards the leaves and the length of the inflorescence; the prominent glands on the margins of the leaves are a noticeable character.

12. SYMPLOCOS PERAKENSIS, King & Gamble, n. sp. A tree with spreading branches reaching 50 to 60 feet in height; stem 15 to 20 in. in diam; branchlets dark brown, very slender. *Leaves* chartaceous; elliptic, long caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, green when dry; margins entire, recurved; 2 to 3.5 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves 6 to 7 pairs, the two lowest near the margin and produced upwards along it, the others curved upwards to meet in a looped intramarginal nerve, which is rather prominent; secondary nerves and reticulations obscure; petiole .2 in. long, channelled above. *Inflorescence* a sessile 3-branched panicle of racemes axillary to the upper leaves or on the branchlets below them, 1 to 2 in. long or less; panicle branches and racemes very slender, the latter about 8–10-flowered; rachis grey-pubescent; 1 bract and 2 bracteoles, ovate-acute, scarcely .05 in. long, persistent; pedicels about .05 in. long. *Calyx-tube* short; lobes 5, rounded, grey-pubescent, ciliate, .05 in. long, as long as tube. *Corolla-tube* short; lobes oblong, white, .125 in. long. *Stamens* about 40, in 5 bundles opposite the corolla-lobes; filaments slender, exsert; anthers rounded, minute. *Ovary* villous; cells 3; style rather thick, villous, .1 in. long, stigma small. *Fruit* a cylindrical glabrous drupe, .4 to .5 in. long, .25 in. in diam., the top rusty-hirsute and crowned by the persistent rusty-hirsute calyx-lobes, the calyx-rim .1 in. broad; exocarp fleshy, endocarp hard, bony. *Seeds* 3, testa rather thick, embryo straight.

PERAK: *Scortechini* 646; *Wray* 2593, 2944; *King's Collector* 4446, 4570, 4586, 7863, 10163, 10501, 10515, 10801, 10985. SELANGOR: *Ridley* 10223.

This species is very near to *S. adenophylla*, but the leaves are entire, much thinner and smaller, and not glandular, and the inflorescence is more compound, more slender, grey- and not rusty-pubescent, and has rounded calyx-lobes.

13. *SYMPLOCOS BRANDIANA*, King & Gamble, n. sp. A small tree reaching 15 to 25 feet in height; stem 4 to 6 in. in diam.; branchlets round, densely covered with soft ferruginous tomentum and long stiff hispid hairs; innovations densely ferruginous-silky-tomentose. *Leaves* membranous; ovate-oblong, long acuminate at apex, rounded or cordate at base; pilose on both surfaces, at length glabrescent above, paler beneath, olive-brown when dry; margin entire, recurved, thickly villous; 3 to 6 in. long, 1 to 2 in. broad; midrib slender, prominent beneath; main-nerves about 8 pairs, much curving upwards to join as a looped intra-marginal nerve, raised beneath; reticulations obscure; petiole scarcely .1 in. long. *Inflorescence* of axillary few-flowered racemes or panicles up to 1.5 in. long, lax-flowered; rachis slender, thickly ferruginous-villous, as are the bracts and calyx; bracts leaf-like, cuspidate-acuminate, .2 to .4 in. long; bracteoles 2, similar but smaller; pedicels .1 in. long; flowers white. *Calyx-tube* very short; lobes linear-lanceolate, .1 to .2 in. long. *Corolla-tube* very short; lobes elliptic-obtuse, glabrous, 3-nerved, .15 in. long. *Stamens* 60 to 70 or even more, in 5 bundles opposite the corolla-lobes; filaments slender; anthers small, rounded. *Ovary* and disk villous, style slender, stigma capitate. *Fruit* oblong-cylindrical, light blue, constricted above the middle, villous, .8 in. long, .3 in. broad; exocarp fleshy, endocarp crustaceous; cells 3, the lower one bearing 1 seed; albumen fleshy; embryo slightly curved.

PERAK: *Curtis* 2030; *Scortechini* 346, 349 on Maxwell's Hill, 3,000 feet; *Wray* 677 at Waterfall Hill, Larut; *King's Collector* 1887, in dense jungle on rocky creeks.

We have named this handsome species in honour of the author of the most recent monograph of the genus.

14. *SYMPLOCOS CONCOLOR*, Brand Monog. Sympl. 65 (1901). A tree, reaching 30 to 40 feet in height; branchlets dark brown, innovations tawny-pubescent. *Leaves* thinly coriaceous; oblong or oblong-obovate, abruptly acuminate at apex, the acumen mucronate, attenuate at base; glabrous on both surfaces, shining above; margins entire or obscurely dentate; 3 to 4 in. long, 1–1.5 in. broad; midrib slender, slightly raised above; main-nerves 6 to 7 pairs, rather obscure, arching upwards to anastomose near the margin; reticulations prominent; petiole about .1 in. long. *Inflorescence* of sessile or very shortly peduncled, 3-branched panicles up to .5 in. long, all golden-pubescent, about 10–12-flowered; bracts ovate-acute, small; bracteoles smaller, 2 to each pedicel; pedicels slender, about .1 in. long. *Calyx-tube* funnel-shaped, .05 in. long; lobes 5, rounded, short. *Corolla-tube* very short; lobes oblong, .1 in.



long. *Stamens* about 60, scarcely exsert. *Ovary* and disk silky-pubescent; style slender, stigma capitate, 3-4-lobed. *Fruit* an oblong glabrous drupe, .3 in. long, .15 to .2 in. broad, surmounted by the slightly depressed disk which is shortly overtopped by the calyx-lobes.

PENANG: on Penam Bukit at 2,000 feet, *Curtis* 1039.

15. *SYMPLOCOS CALYCODACTYLOS*, Brand Monog. Sympl. 63 (1901). A tree (?); branchlets villous with long tawny spreading bristles, innovations densely villous. *Leaves* membranous; oblong-lanceolate, long-acuminate at apex, rounded at base, sometimes almost cordate; both surfaces covered sparsely with tawny bristles, especially on and along the nerves beneath; margins distantly long glandular denticulate; 4 to 5.5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 8 pairs, curving slightly upwards at an angle of about 30° with the midrib to anastomose near the margin; reticulations prominent, primary ones transverse parallel; petiole stout, villous, .15 to .2 in. long. *Inflorescence* a slender, axillary, tawny-villous raceme, 2 to 3 in. long, with about 4 to 5 flowers; bracts lanceolate-acuminate, .25 in. long, caducous; pedicels .5 in., very slender, ending in a dense tuft of tawny bristles beneath the calyx. *Calyx-tube* short; lobes 5, linear oblong, densely tawny-bristly without, glabrous within, .25 in. long. *Corolla-tube* short; lobes 5, obovate, glabrous, as long as calyx-lobes or slightly longer. *Stamens* about 80, 5-adelphous, filaments flattened; anthers small, rounded. *Ovary* and disk villous; style slender, .1 in. long; stigma small, capitate. *Fruit* unknown.

PERAK: at Waterloo, 3,000 feet, *Curtis* 1330.

16. *SYMPLOCOS OPHIRENSIS*, Clarke in Hook. f. Fl. Br. Ind. III. 479 (1882). A bush (Wray), or more probably a small tree; branches terete, nearly black, glabrous; innovations appressed-tawny-pubescent; buds ovate-acuminate, silky, .1 in. long. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acute or rounded or sometimes emarginate at apex, cuneate or rounded at base; glabrous and usually shining above, sparsely pubescent beneath when young, afterwards glabrous, reddish-brown when dry; margins entire or very obscurely denticulate, recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib stout, impressed above; main-nerves 8 to 10 pairs, raised on both surfaces, straight at first, then curving upwards and joining in an intramarginal looped nerve; secondary nerves many, similar, reticulations prominent; petiole stout, .1 to .2 in. long. *Inflorescence* of very short racemes, from the axils of the upper leaves or from the new wood below them; racemes .3 to .4 in. long, silky-pubescent, 5-7-flowered; bracts and bracteoles very small, ovate, acute; pedicels 0 to .1 in. long. *Calyx-lobes* 5, silky-pubescent, ovate-acute, ciliate, .6 in. long; tube .1 in. long. *Corolla-tube* short; lobes

white, oblong-obtuse, .2 in. long, 5-nerved. *Stamens* in bundles of 6 to 12 each opposite the corolla-lobes, 30 to 60 in all; filaments slender, outer as long as petals; anthers rounded, very small. *Ovary* and disk nearly glabrous at top; style slender, .15 to .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-cylindric, blueish-purple when ripe, .3 to .4 in. long, .2 in. broad, surmounted by calyx-rim with patent lobes, nearly as wide as the top of the fruit; exocarp crustaceous; endocarp very hard, bony, obscurely ribbed and irregularly indented. *Seed* 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 58. *Symplocos* No. 42, Herb. Ind. Or. Hook. f. & Th.

PERAK: on Gunong Bubu, 5,000 feet, Wray 3919; Scortechini. MALACCA: on Mount Ophir, Griffith (K.D.) 3650; Ridley 10083; Derry 623; Lobb.

The specimens of Wray and Scortechini have the leaves rounded at both ends, but there seems no reason to keep them as a separate variety from the specimens from Mount Ophir which are acute at apex and cuneate at base.

17. *SYMPLOCOS CURTISII*, Oliv. in Hook. Icon. t. 1757 (1888). A shrub or small tree, reaching 10 to 15 feet in height; branchlets slender, pale brown, glabrous; leaf-buds small, acuminate, pubescent. *Leaves* chartaceous; elliptic, abruptly long acuminate at apex, cuneate at base; glabrous on both surfaces, pale greenish-brown when dry; margins obscurely denticulate, slightly recurved; 4 to 9 in. long, 1.5 to 3 in. broad; midrib slender, raised beneath, impressed above; main-nerves 5 to 7 pairs, the lowest pair very near the margin, the rest gradually more and more distant, all curving upwards to and along the margin, where they form an intramarginal looped nerve; secondary nerves very few or none; reticulations transverse, fairly prominent, rather distant; petiole .2 to .4 in. long, channelled above. *Inflorescence* of short (up to .4 in. long) racemes axillary to the upper leaves or on the young wood below them; racemes about 5-flowered; bract ovate-acute, .1 in. long, keeled, villous; bracteoles 2, similar but smaller; pedicels stout, about .05 in. long. *Calyx-tube* about .1 in. long; lobes 5, ovate, obtuse, as long as tube, all minutely pubescent without. *Corolla-tube* very short, lobes elliptic-oblong, .2 in. long, 5-nerved, white. *Stamens* many, 60 or more; filaments slender, longer than corolla-lobes; anthers rounded, minute; staminal bundles only noticeable in bud. *Ovary* villous, disk glabrous; style slender, .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* a cylindric oblong berry, bright blue when ripe, .5 to .8 in. long, somewhat constricted at about one-third distance from the top; the top surmounted by the calyx-rim and connivent teeth; exocarp

crustaceous, endocarp woody; cells 1 to 3. *Seed* usually 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 69.

PENANG: *Curtis* 1099. PERAK: *Wray* 692, 2830; *Scortechini* 328, 646, 1423; *King's Collector* 2084, 2099, 2406, 8431.

18. *SYMPLOCOS CRASSIPES*, Clarke in Hook. f. Fl. Br. Ind. III. 580 (1882). A tree (?); branchlets stout, smooth, grey. *Leaves* stoutly chartaceous; large, elliptic-lanceolate, abruptly acuminate at apex, subcordate or obtusely rhomboid at base; glabrous on both surfaces; margins sub-entire, slightly recurved; 6 to 7 in. long, 2 to 3 in. broad; midrib prominent, thick; main-nerves 10 to 12 pairs, irregular and at irregular angles, usually only slightly curved upwards to meet in a looped intra-marginal nerve .25 in. from margin; secondary nerves and few transverse reticulations prominent; petiole very stout, .15 to .2 in. long. *Racemes* axillary, 4-flowered; pedicels very small, .1 in. long at most; bracts ovate-acute, like the rachis and calyx densely ferruginous-pubescent. *Calyx-tube* very short; lobes ovate, .075 in. long. *Corolla-tube* short; lobes .1 to .15 in. long, oblong-obtuse. *Stamens* about 30, slightly exsert. *Ovary* 3-celled; disk fulvous-pilose. *Fruit* not known. Brand Monog. Sympl. 52.

MALACCA: on Mount Ophir, *Maingay* (K.D.) 960.

19. *SYMPLOCOS PENANGIANA*, King & Gamble, n. sp. A small tree (?); branchlets rounded, upper ones and innovations densely dark ferruginous-hirsute. *Leaves* chartaceous; lanceolate, long acuminate at apex, somewhat rounded at base; glabrous above, sparsely pilose beneath with long stiff ferruginous hairs especially on and along the nerves; greenish-brown when dry; margins distantly but sharply serrate in the middle part, entire on the acumination and near the base, revolute; 4 to 7 in. long, 1 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 4 to 6 pairs, irregularly distant, curving upwards and meeting about .2 in. from the margin in a looped intramarginal nerve; secondary nerves and transverse reticulations scanty but prominent; petiole short, .15 in. long, stout, hirsute. *Inflorescence* a sessile very short raceme or panicle of flowers on the young branches; bracts several, very small, densely rusty-hirsute. *Calyx-tube* short; lobes 5, oblong, obtuse, .125 in. long, glabrous within, densely rusty-hirsute without. *Corolla-tube* short; lobes 5, oblong, rounded, .2 in. long. *Stamens* about 30; filaments slender; anthers rounded. *Ovary* villous; style slender, pubescent, .15 in. long; stigma capitate. *Fruit* unknown.

PENANG: at West Hill, 2,500 feet, *Curtis* 325.

20. *SYMPLOCOS CERASIFOLIA*, Wall. Cat. 4434 (1829). A tree, reaching 60 feet and even 80 feet in height; stem with a diam. of 20 in.; branchlets glabrescent, smooth, somewhat angled, reddish-brown; leaf-

buds nearly globose, scales rounded, acuminate. *Leaves* coriaceous-chartaceous; oblong or elliptic-oblong, acuminate at apex, cuneate or attenuate at base; glabrous above, sparsely pilose on the nerves beneath otherwise glabrous, dark greenish-brown when dry; margins crenately serrate except at the very base and on the acumination, slightly recurved; 5 to 7 in. long, 1 to 2 in. broad, midrib slender, impressed above; main-nerves 6 to 8 pairs, conspicuous, at once curving upwards and round to join each other in a well-marked looped ring .2 to .3 in. from the margin; reticulations transverse; petiole .5 to .7 in. long, slender, channelled above. *Inflorescence* of axillary and sub-terminal pubescent spikes; the rachis stout, angular; bracts broad, round, villous, early caducous; bracteoles 2, ovate-acute, .075 in. long, villous; flowers about 12 in each spike. *Calyx-tube* short, .05 in. long; lobes lanceolate, acute, pilose, .125 in. long. *Corolla-tube* short; lobes oblong-acute, 3-nerved, .2 in. long. *Stamens* about 30, or very numerous—over 100 (Scortechini), on the corolla-tube, fascicles not well separated; filaments very slender; anthers rounded, very minute. *Ovary* and disk slightly hairy; style slender, curved, .2 in. long, stigma capitate; cells 3, ovules 2 to 3 in each cell. *Fruit* a cylindric oblong drupe 1.5 to 2 in. long, 1 in. broad, truncate at both ends and tipped above by the persistent calyx-tube and lobes, the rim about .2 in. broad; smooth, yellowish-brown; exocarp thick, corky; endocarp woody with 7 to 8 sharp star-like ridges. *Seed* 1, testa membranous; albumen thin, embryo straight, pendulous; radicle long. A. DC. Prod. VIII. 257; Clarke in Hook. f. Fl. Br. Ind. III. 580; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Brand Monog. Sympl. 52. *Bobua cerasifolia*, Miers in Journ. Linn. Soc. XVII. 304.

PENANG: Wallich 4434; Curtis 1503, 3096. PERAK: Wray 445, 3003; Scortechini 515; King's Collector 6283, 6950. MALACCA: Maingay (K.D.) 962

Scortechini considered his No. 515 to represent a species separate from *S. cerasifolia*, but with a large series of specimens before us we find it difficult to agree to this.

21. SYMPLOCOS RIGIDA, Clarke in Hook. f. Fl. Br. Ind. III. 581 (not of Wall.) (1882). A tree with spreading branches, reaching 60 to 80 feet in height and 18 to 24 in. in diam. of stem; branchlets stout, dark brown, glabrous, angled when dry, marked with the prominent round raised scars of fallen leaves; branch-buds large, covered with oblong glandular-serrate stipular scales, softly silky on the back; leaf-buds acuminate, .3 to .5 in. long, silky-pubescent. *Leaves* coriaceous-chartaceous; oblong or oblong-lanceolate, acute or shortly acuminate at apex, attenuate at base; glabrous on both surfaces

and usually shining, dark greenish-brown when dry; margins entire or very shortly serrate, recurved when dry; 6 to 12 in. long, 2·5 to 5 in. broad; midrib stout, much raised beneath, impressed above; main-nerves 10 to 13 pairs, raised beneath, curving upwards to and along the margin; secondary nerves few or none; reticulations transverse, parallel, not prominent; petiole ·7 to 1·3 in. long, stout, glabrous. *Inflorescence* of simple spikes, strobilate when young and scarcely ·5 in. long, in flower 1·5 to 2 in. long with pubescent rachis, in fruit reaching 3 in. long with stout nearly glabrous rachis, in the axils of upper leaves or the young branchlets below them; bracts broadly ovate, acute, concave, minutely grey or tawny-pubescent; bracteoles 2, lanceolate-acute, ·1 in. long, all early deciduous; buds ovoid, grey-pubescent. *Calyx-tube* ·075 in. long; lobes 4, ovate-acute, blunt, ·1 to ·15 in. long, both grey-pubescent. *Corolla-tube* short, lobes 5, white, oblong, acute, ·25 in. long, 5-nerved. *Stamens* in 5 bundles opposite the corolla-lobes, about 60; filaments very slender, outer ones longer than corolla-lobes; anthers rounded, minute. *Ovary* and disk glabrous; style curved, ·25 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-oblong, 1 to 1·5 in. long, ·75 to 1 in. broad, waxy greenish-white when half ripe, dark blue when ripe; pale brown, shining, smooth, obscurely angled when dry; surmounted by the calyx-rim ·15 in. broad with erect calyx-teeth; exocarp thick, fleshy; endocarp very hard, woody, with 8 sharp star-like ridges; cells 3. *Seeds* 1 to 3, testa thin fibrous, albumen fleshy, embryo straight, radicle long. Brand Monog. Sympl. 52. *Doxomma rigidum*, Miers in Trans. Linn. Soc. Ser. 2. Bot. I. 104. *Barringtonia rigida*, Clarke in Hook. f. Fl. Br. Ind. II. 510.

PERAK: Wray 1294, 3207; Scortechini 2046; King's Collector 4246, 4277, 4613, 5045, 5048, 6095, 6179, 7260, 7898, 8543, 10013. SELANGOR: Ridley 10544. MALACCA: Maingay (K.D.) 767, 965. SINGAPORE: Cantley 50; Ridley 1798, 5960.

22. SYMPLOCOS RUBIGINOSA, Wall. Cat. 4432 (1829). A large shrub or a tree sometimes reaching 70 to 100 feet in height and 15 to 20 in. or more in diam. of stem; branches stout, grey, nearly glabrous; branchlets stout, angled, glabrous or cinnamomeous- or ferruginous-hirsute; leaf-buds lanceolate, ·3 to ·4 in. long. *Leaves* coriaceous-chartaceous; obovate-oblong, acute or shortly and abruptly acuminate at apex, cuneate at base; glabrous above, pubescent especially on the nerves beneath, the pubescence pale rusty-brown, pale greenish-brown when dry; margins shortly dentate especially on the upper half, sometimes nearly entire, recurved; 5 to 11 in. long, 2 to 4 in. broad; midrib stout, prominent beneath, impressed above; main-

nerves 10 to 13 pairs, parallel, very prominently raised beneath and usually impressed above, curving upwards to and along the margin; secondary nerves few or none; reticulations many, prominent, transverse, parallel; petiole thick, densely pubescent, .5 to 1 in. long. *Inflorescence* of simple erect spikes, from the axils of upper leaves or from the young branchlets below them; spikes 1 to 2 in. long, softly cinnamomeous-pubescent, the rachis stout especially in fruit; flowers about 12 to 16 in each spike, each flower supported by a broad ovate rounded bract .175 in. long and two ovate-acute bracteoles .1 in. long. *Calyx-lobes* ovate-lanceolate, acute, .06 to .07 in. long; tube as long as lobes. *Corolla-tube* short, lobes white, oblong, .15 in. long, 3-nerved, glabrous. *Stamens* in 5 bundles opposite to the corolla-lobes, usually about 30; filaments unequal, the outer ones longer than the corolla-lobes; anthers minute, round. *Ovary* and disk glabrous, style slender, about .15 in. long, stigma capitate or lobed; cells 3. *Fruit* an ovoid-oblong drupe, .4 in. long, .25 in. broad, surmounted by the calyx-rim .1 in. in diam., pale brownish-yellow when dry, glabrous or softly pilose; exocarp thin, crustaceous, fragile; endocarp woody, faintly ridged; seeds usually 3. A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 580; Brand Monog. Sympl. 53. *Lodhra rubiginosa*, Miers in Journ. Linn. Soc. XVII. 299.

PENANG: *Wallich* 4432; *Curtis* 528, 1692; *G. King*. PERAK: *Scortechini* 1825; *King's Collector* 5192, 5771, 7112, 8105, 10015, 10021. MALACCA: *Maingay* (K.D.) 955; *Griffith* (K.D.) 3652. JOHORE: *Ridley* 11115. SINGAPORE: *Cantley* 72; *Ridley* 4117.—DISTRIB. Sumatra (*Forbes* 1991), Borneo (*Beccari* 1216, *Haviland* 1679, 3480).

#### Subgenus II.—CORDYLOBLASTE.

23. SYMPLOCOS CONFUSA, Brand Monog. Sympl. 88 (1901). A shrub, 5 to 8 feet high (Lobb); branchlets rough, dark brown, marked with prominent cushion-like scars, uppermost ones and innovations ferruginous-pubescent. *Leaves* chartaceous; variable in shape, elliptic-oblong to ovate-lanceolate bluntly acute at apex, attenuate often unequally at base; margins entire or slightly undulate, recurved; glabrous on both surfaces; 3 to 4 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves irregular, about 6 pairs; secondary nerves and reticulations also irregular, indistinct; petiole .2 to .3 in. long, slightly pubescent. *Inflorescence* of very short, 1-4-flowered, axillary, grey-silky racemes about .25 in. long; bracts very small, ovate-acute; bracteoles also minute, 2 to each pedicel; pedicels .05 to .1 in. long; flowers white, sweet-scented. *Calyx-tube*

campanulate, grey-silky, .1 in. long; lobes 5, short, rounded, ciliate. *Corolla-tube* funnel-shaped, .2 to .3 in. long, glabrous; lobes 5, oblong, obtuse, spreading, .15 in. long. *Stamens* very many (40 to 60), inside a staminal tube somewhat longer than the corolla-tube; filaments very short, slender; anthers small, rounded. *Ovary* and disk villous; style slender, hirsute or glabrescent, .3 to .5 in. long; stigma large, capitate. *Fruit* not known. *S. Henschelii*, Benth. & Hook. f. ex Clarke in Hook. f. Fl. Br. Ind. III. 588; Forbes & Hemsl. in Journ. Linn. Soc. XXVI. 73.

MALACCA: on Mount Ophir, Griffith (K.D.) 3644; Lobb; Maingay (K.D.) 954.—DISTRIB. Borneo (Beccari 2405), China.

This species, which in the Fl. Br. Ind. was placed under *S. Henschelii*, has been separated by Brand, who considers the true *S. Henschelii* (*Cordyloblaste Henschelii*, Moritz in Bot. Zeit. vi. 604 (1848), to be a Java plant only. It is not thought necessary to maintain Clarke's var. *hirtistylis*.

24. *SYMPLOCOS MAINGAYI*, Benth. ex Clarke in Hook. f. Fl. Br. Ind. III. 588 (1882). A tree with spreading branches reaching 40 to 60 feet in height and 10 to 15 in. in diam. of stem; branches stout, light brown; branchlets and innovations densely ferruginous-velvety-pubescent. *Leaves* chartaceous; elliptic-oblong, shortly acuminate at apex, broadly attenuate or rounded at base; glabrous or with a few scattered hairs above, sparsely pubescent beneath except the nerves which are hirsute, marked also beneath by numerous faint transverse lines; margins entire; 4 to 6 in. long, 2 to 2.5 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 8 pairs, curving upwards and joining in a looped intramarginal nerve, impressed above; secondary nerves few and with the reticulations regular; petiole .3 to .5 in. long, stout, densely ferruginous-pubescent. *Inflorescence* of stout densely ferruginous-pubescent racemes, 1 to 1.5 in. long, bearing about 8 to 10 flowers, in the axils of the upper leaves; bract 1, ovate, acute, .2 in. long; bracteoles 2, similar but smaller; pedicels stout, .1 to .15 in. long. *Calyx-tube* campanulate, densely rusty-pubescent; teeth 5, rounded, .05 in. long. *Corolla-tube* narrow funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes .5 in. long, oblong, reflexed. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it; top of tube truncate, 15-20-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 60; free part of filaments short, slender; anthers ovoid. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3. *Fruit* obovoid, obtuse, glabrous, 1.75 in. long, 1.25 in. broad, crowned

with the remains of the calyx-rim .125 in. wide, pericarp very thick, woody. Brand Monog. Sympl. 90.

PERAK: *King's Collector* 6728. MALACCA: *Maingay* (K.D.) 961.

25. SYMPLOCOS SCORTECHINII, King & Gamble, n. sp. A tree (?); branchlets pale brown, slender, scurfy; innovations sparsely grey-pubescent. *Leaves* chartaceous; oblong-lanceolate, attenuately blunt-acuminate at apex, cuneate at base; glabrous on both surfaces dark brown when dry, margins entire; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath, impressed above; main-nerves 8 to 10 pairs the lowest close to the margin, the others curved upwards to meet in a looped intramarginal nerve; secondary nerves many and, with the reticulations, irregular, fairly prominent; petiole .5 in. long, channelled above, slightly pubescent when young. *Inflorescence* of axillary or pseudo-terminal racemes, .7 to 1 in. long, sometimes giving the appearance of a terminal panicle; rachis grey-pubescent, angular; bract and 2 bracteoles lanceolate-acuminate, .1 to .15 in. long; pedicels .2 in. long. *Calyx-tube* campanulate, .2 in. long, grey-pubescent without, as are the rounded obtuse .05 in. long teeth. *Corolla-tube* slender, funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes .5 in. long, oblong-obtuse, much imbricate in bud. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it, top of tube truncate, about 15-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 50; free part of filaments short, slender; anthers rounded. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* obovoid-oblong, obtuse, glabrous, 1.75 in. long, 1.2 in. broad, crowned with the remains of the calyx-rim .1 in. in diam.; pericarp thick, corky; seed 1.

PERAK: *Scortechini*.

This species comes very near to *S. Maingayi* in respect to its flowers and fruit, but the branches are much more slender, the dense ferruginous tomentum is absent, and the leaves are different, so we have no hesitation in describing it as a new species.

The following Bornean species seems worthy of description here: it may possibly be found also in the Peninsula:—

SYMPLOCOS HAVILANDI, King & Gamble, n. sp. A small tree (?); branchlets stout, somewhat flattened, yellowish-brown; leaf-buds conical, glabrous. *Leaves* coriaceous; elliptic, abruptly acuminate at apex, acute at base; glabrous on both surfaces, orange-brown when dry; margins entire, recurved; 3 to 4 in. long, 1.25 to 1.75 in. broad; midrib stout, impressed above; main-nerves 7 to 8 pairs, the lowest pair near the margin and more acutely angled (about 45°) than the others, straight at first at an angle of 60°, then curved to meet in a widely looped intramarginal nerve, prominently raised above when dry; secondary-nerves and reticulations also raised; petiole .4 to .5 in. long, stout, rough, the upper half winged by the decurrent margin of the blade. *Inflorescence* a nearly sessile, few-branched panicle of racemes, about 1.5 in. long;



flowers about 12; rachis glabrous, flattened; bracts and bracteoles minute, caducous; pedicels none or very short, scarcely .05 in. long; buds globose. *Calyx-tube* .05 in. long; lobes orbicular, ciliate, as long as tube. *Corolla-tube* very short; lobes 5, .15 in. long, ovate-oblong, ciliate. *Stamens* about 50, in 5 bundles of about 10 each, opposite the corolla-lobes; anther-cells orbicular; filaments slender, the longest as long as the petals. *Ovary* conical, glabrous; style slender, .1 in. long, stigma capitate. *Fruit* not known.

BORNEO: in Sarawak, near Kuching, *Haviland* No. 1954.

## 2. STYRAX, Linn.

Trees and shrubs, usually more or less lepidote or stellate-tomentose on all parts except the upper-surface of the leaves, rarely glabrous. *Leaves* various in shape, entire or serrulate. *Flowers* generally white, in lax axillary or terminal, simple or compound, often pendulous racemes; bracts very small. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short; lobes 5, erecto-patent, elliptic-oblong, imbricate or valvate. *Stamens* 10, 1-seriate at the base of the corolla-tube; filaments more or less flattened, continuous with the connective; anthers large, linear, the cells parallel, erect. *Ovary* nearly free, at first 3-celled, later often 1-celled; style subulate; stigma capitate, somewhat 3-lobed; ovules few in each cell, in free ovaries nearly all erect from the lower basal angle, in half-adnate ovaries upper pendulous lower erect. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, breaking up irregularly. *Seeds* 1 or rarely 2 or more, integuments 2, the outer chartaceous or hardened, the inner membranous; albumen fleshy, copious; embryo straight, axile or excentric; cotyledons broad, with a longish terete radicle.—DISTRIB. Warmer regions of Asia and America, a few extending to temperate Asia and South Europe, species about 60.

Leaves green beneath, slightly stellate-pubescent . . . . . 1. *S. serrulatum*.  
Leaves white or greyish-white beneath, with occasional rusty-stellate hairs:—

Leaves small, under 5 in. long and 2.5 in. broad; calyx about one-third of the length of the corolla . . . . .	2. <i>S. Benzoin</i> .
Leaves large, over 5 in. long and 2.5 in. broad; calyx about half of the length of the corolla . . . . .	3. <i>S. crotonoides</i> .

1. *STYRAX SERRULATUM*, Roxb. Fl. Ind. II. 415 (1832). A shrub or small tree, reaching 50 feet in height; branches slender, branchlets stellately grey-pubescent. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate, sometimes acute at base; nearly glabrous above, glabrescent beneath, but with stellate hairs on both sides of the nerves; margins sparingly and irregularly serrate, sometimes sub-

entire, slightly revolute; 1·5 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 6 to 8 pairs, curving upwards and anastomosing near the margin; secondary nerves and reticulations prominent, the latter transverse; petiole ·2 in. long, stellate-pubescent. *Racemes* terminal or from the axils of the uppermost leaves of the branchlets, 6-8-flowered or fewer, sometimes reduced to 1 only, sometimes paniculate from the absence of leaves, 1 to 2 in. long; rachis slender, densely white-stellate-pubescent; pedicels ·2 in. long; bracteoles linear, nearly as long as pedicels; flowers white. *Calyx* campanulate; tube white-pubescent without, glabrous within, ·15 in. long; teeth 5, ·05 in. long, irregular, repand-dentate, white-pubescent on both sides. *Corolla-tube* ·15 in. long, cylindric; lobes 5, ·25 in. long, oblong, sub-acute, densely white-pubescent without and within except the lower part of the tube. *Stamens* 10, 2·5 in. long; filaments inserted on the corolla-tube, wide and white-tomentose at the base, narrower and glabrous above, continued in the connective; anthers broadly linear, erect, as long as the filaments, rounded at top, cells 2 parallel. *Ovary* densely white-villous; style slender, ·3 in. long; stigma small, capitate; cells 3. *Fruit* ellipsoid, ·4 to 5 in. long, ·3 in. broad, white- or grey-pubescent, supported by the patelliform calyx; pericarp fleshy, rather thin, irregularly breaking up. *Seeds* 1, rarely 2 or more; outer integument smooth, hard, shining, brittle; inner one membranous, brown; albumen firm, grey; embryo erect, nearly as long as the endosperm; cotyledons cordate, ·15 in. long; radicle thick, terete, as long as cotyledons. Wall. Cat. 4402; A. DC. Prod. VIII. 267; Hook. f. in Bot. Mag. t. 5950 (*syn. excl.*); Kurz in Journ. As. Soc. Beng. XLVI. ii. 237 and For. Fl. II. 142; Clarke in Hook. f. Fl. Br. Ind. III. 588; Prain Beng. Plants I. 656. *S. Porterianus*, Wall. Cat. 4401; A. DC. l.c.; Miq. Fl. Ind. Bat. I. Pt. 2, 463. *S. floribunda*, Griff. Notul. IV. 287.

PENANG: Wallich 4401; Phillips; Curtis 1187, 1538; Ridley 7176. PERAK: King's Collector 1662.—DISTRIB. India, at 3,000 to 7,000 feet from Nepal to Assam, Chittagong and Burma.

The plant is frequently affected by galls.

2. *STYRAX BENZOIN*, Dryand. in Phil. Trans. Vol. LXXVII. 308, t. 12 (1787). A tree with slender drooping branches, reaching 60 to 80 feet in height and 2 to 3 feet in diam. of stem; branches rounded, glabrous; upper branchlets rusty-grey-stellate-pubescent. *Leaves* chartaceous; elliptic, acuminate at apex, attenuate or rounded at base; glabrous above, densely grey-stellate-pubescent beneath; margins entire or rarely slightly denticulate; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 6 to 8 pairs, curving

upwards to and along the margin; reticulations transverse, regular, prominent; petiole .3 to .5 in. long, channelled above, densely grey-stellate-pubescent. *Racemes* paniculate, terminal or axillary to the upper leaves, grey-stellate-pubescent; bracts ovate, caducous; pedicels slender, angular, .1 to .2 in. long; bracteoles linear, as long as the pedicels or nearly so; flowers silvery-white. *Calyx* cupular, .15 in. long, densely grey-stellate-pubescent without; teeth 5, minute. *Corolla-tube* .15 in. long, cylindric; lobes 5, .3 in. long, oblong-linear, acute, white-pubescent without and more or less within, recurved. *Stamens* 10, .3 in. long, attached to the tube of the corolla; filaments flattened, .15 in. long, white-pubescent, continued in the connective; anthers linear, slender, erect, acute at tip, as long as filaments, cells parallel. *Ovary* conical, villous above; style slender, .3 in. long; stigma small, capitate; cells 3, ovules 2 or more in each cell, placentas central. *Fruit* depressed-globose, variable in size, reaching .8 in. in diam. and .6 in. in height; white-pubescent, supported by the flattened persistent patelliform calyx; pericarp corky, rather thick, irregularly dehiscent. *Seed* usually 1, pale-brown with a broad basal hilum; outer integument hard, brittle, inner membranous; albumen firm; embryo horizontal or oblique, nearly as long as the endosperm; cotyledons flattened, oblong-cordate, .2 in. long; radicle smooth, .15 in. long, cylindric. Blume Bijdr. 671; Roxb. Fl. Ind. II. 416; A. DC. Prod. VIII. 260; Benth. & Trim. Med. Pl. III. t. 169; Miq. Fl. Ind. Bat. I. Pt. 2, 463; Clarke in Hook. f. Fl. Br. Ind. III. 589; Gürke in Engl. & Prantl Pflanzenfam. IV. i. 178, fig. 93; Koord. & Val. Bijdr. VII. 132.

PERAK: Wray 808, 1208; Scortechini 1998; King's Collector 4459, 7840, 7884, 8615, 10203, 10305. MALACCA: Maingay (K.D.) 963, 964; Griffith (K.D.) 3668. SINGAPORE: Ridley 2650.—DISTRIB. Sumatra (Beccari 699; Forbes 3120A); Java (Forbes 1183).

This species gives the gum "Benzoin," or "Benjamin," of commerce. The plant is often affected by galls, causing curious tassel-like excrescences on the branches. The tree has the odour of violets (Wray).

3. *STYRAX CROTONOIDES*, Clarke in Hook. f. Fl. Br. Ind. III. 589 (1882). A tree, 60 to 80 feet high and 15 to 20 in. in diam. of stem; branches spreading and drooping; branchlets rather thick, grey, ultimate ones and innovations densely clothed with whitish-grey and rusty-stellate tomentum, the rusty hairs large and scattered among the rest. *Leaves* chartaceo-coriaceous; broadly oblong or elliptic-oblong, abruptly acuminate at apex, attenuate or cuneate at base; glabrous above except on the nerves, densely white-tomentose beneath, and with scattered rusty-stellate hairs; margins entire or undulate; 5 to 7 in. long, 2.5 to

4 in. broad; midrib prominent beneath, impressed and stellate-pilose above; main-nerves about 10 pairs, prominent, arched upwards to and along the margin; reticulations prominent, transverse; petiole .3 to .4 in. long, stellate-pubescent. *Racemes* in terminal and axillary panicles, 4 to 8 in. long, densely white-tomentose and rusty-stellate-pilose, including calyx; pedicels very short, 0 to .15 in. long; bracts oblong-lanceolate, glandular-dentate, .25 in. long; bracteoles 2, linear-subulate, .15 in. long; flowers creamy-white. *Calyx-tube* cupular, .2 to .25 in. long, truncate; teeth 5, very minute. *Corolla-tube* short, .15 long, glabrous at the very base, appressed white-pubescent above; lobes 5, valvate, .3 in. long, linear-oblong, acute, afterwards recurved. *Stamens* 10, about .3 in. long; filaments short, flat, glabrous, continued in the connective which is white-pubescent on the back; anthers .2 in. long, linear, mucronate, cells parallel. *Ovary* 5-lobed, white-villous, conical; style slender, as long as corolla; stigma capitate; cells 3, ovules 5 to 6, erect. *Fruit* ovoid, grey-pubescent, mucronate, .75 to 1 in. in diam., supported by the cupuliform calyx; pericarp thick, corky. *Seed* 1, outer integument pale brown, smooth, crustaceous, with a broad basal hilum, inner integument membranous; albumen firm, endosperm cushion-like; embryo somewhat oblique; cotyledons cordate, .2 in. long; radicle thick, terete, as long as cotyledons. *Crotoni affinis* sp. Wall. Cat. 7348.

PERAK: *Scortechini* 179; *King's Collector* 7775, 7967, 8558, 10734. SINGAPORE: *Wallich* 7848; *Cantley* 60.

This species, like the others, is also frequently found with large tassel-like insect galls in place of the inflorescence.

#### Order LXXIV. OLEACEÆ.

Erect or climbing shrubs or trees, unarmed. *Leaves* usually opposite, rarely alternate or verticillate, simple or pinnately 3-few-foliolate, entire or toothed; stipules none. *Inflorescence* sometimes dichotomously cymose and centrifugal, sometimes trichotomously paniculate, some or all branches centripetal; cymes or panicles axillary or terminal. *Flowers* hermaphrodite, often dimorphous, sometimes polygamous or diœcious, regular. *Calyx* free, usually small, campanulate, 4- or more-toothed or -lobed, rarely 0. *Corolla* gamopetalous; tube long or short; lobes or petals 4 to 12, imbricate or induplicate-valvate in bud. *Stamens* usually 2, sometimes 4, inserted on the corolla, or hypogynous if the petals are free or 0; filaments usually short; anthers rather large, ovate or oblong, rarely linear, dehiscing on the margin. *Ovary* free, 2-celled; style short or long; stigma simple or 2-lobed; ovules 1 to 2, rarely more, in each cell, attached to the inner angle near

the apex or base. *Fruit* capsular, loculicidally 2-valved or indehiscent, or a berry or drupe. *Seeds* solitary or 2 in each cell, erect or pendulous; testa thin or bony; albumen fleshy or horny or 0; embryo straight; radicle inferior or superior.—DISTRIB. Tropical and temperate regions of the world; genera about 18, species about 280.

Corolla-lobes imbricate :—

Seeds exalbuminous; usually climbing shrubs	..	..	1. JASMINUM.
Seeds albuminous; small trees..	..	..	2. OSMANTHUS.

Corolla-lobes valvate :—

Radicle superior; trees or erect shrubs :—

Corolla-tube very short, petals often in pairs	..	..	3. LINOCIERA.
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Corolla tubular, sometimes absent	..	..	4. OLEA.
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Radicle inferior; climbing shrubs	..	..	5. MYXOPYRUM.
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*Nyctanthes Arbor-tristis*, Linn., is found in gardens in cultivation.

### 1. JASMINUM, Linn.

Erect or climbing shrubs. *Leaves* opposite or rarely alternate, simple trifoliolate or imparipinnate, generally entire; petiole usually articulate. *Flowers* often handsome, white pink or yellow, often sweet-scented, in 2- or 3-chotomous or simple cymes or sometimes solitary, axillary or terminal, inflorescence centrifugal; bracts linear and small or ovate, sometimes petaloid, bracteoles usually linear. *Calyx-tube* usually funnel-shaped or campanulate; lobes 4 to 9, linear, long or short or 0. *Corolla-tube* narrow, more or less elongate; lobes 4 to 9, spreading, much imbricate. *Stamens* 2, usually included in the corolla-tube; filaments short; anthers oblong, attached to the filaments at the back near the base, cells parallel, connective broad, usually produced in a mucronate point. *Ovary* 2-celled; ovules usually 2 in each cell, attached near the base; style filiform, long or short, often both in different flowers on the same plant; stigma oblong or capitate, generally bifid. *Berry* didymous or simple by suppression of one carpel; carpels globose, ellipsoid or elongate, pericarp usually of two layers, the outer (exocarp) membranous, the inner (endocarp) fleshy or fibrous. *Seeds* usually 1 in each carpel, sometimes 2, testa very thin; albumen none; cotyledons plano-convex; radicle inferior, very small, included within the cotyledons or slightly exsert.—DISTRIB. Tropical and warm temperate regions of Asia, Africa, and Australia, one species in Europe, many in cultivation: about 90 species in all.

Leaves simple :—

Leaves penninerved, basal pair of nerves not opposite nor produced to form an intramarginal nerve :—

Inflorescence terminal :—

Erect or straggling shrub	..	..	..	1. J. Sambac.
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## Climbing shrubs :—

Calyx-lobes .2 in. long or longer ; leaves rather large :—

Leaves chartaceous :—

Leaves and branchlets fulvous-pilose, main-nerves

10 to 12 pairs .. .. 2. *J. Griffithii*.

Leaves and branchlets glabrous, main-nerves 6 to

8 pairs .. .. 3. *J. Maingayi*.

Leaves membranous :—

Calyx-lobes spreading, .25 in. long or longer ; fruit-  
ing pedicels thickened .. .. 4. *J. Wrayi*.Calyx-lobes erect, .5 in. long ; pedicels very short .. 5. *J. Curtisii*.Calyx-lobes under .2 in. long, pubescent ; leaves  
small :—Corolla-tube short, .25 in. long .. .. 6. *J. decussatum*.Corolla-tube .6 to .8 in. long .. .. 7. *J. bifarium*.Inflorescence axillary .. .. 8. *J. adenophyllum*.Leaves penninerved, basal pair of nerves opposite, produced to  
form an intramarginal nerve :—

Basal pair of nerves prominent, branchlets round :—

Flowers in few-flowered long-peduncled cymes ; pedicels

1 to 1.5 in. long .. .. 9. *J. longipetalum*.

Flowers in many-flowered short-peduncled cymes ; pedi-

cels under .5 in. long .. .. 10. *J. smilacifolium*.Basal pair of nerves not prominent, branchlets 4-angular .. 11. *J. insigne*.Leaves 3-foliolate .. .. 12. *J. Scortechinii*.

1. JASMINUM SAMBAC, Ait. Hort. Kew. I. 8 (1789). A sub-erect, straggling, scarcely climbing shrub ; branches terete, smooth ; branchlets slender, pubescent. *Leaves* membranous ; variable, usually ovate, often broadly so, acute or obtuse at apex, cuneate or rounded or cordate at base ; glabrous above, pubescent on the nerves beneath, often with tufts of hair in the axils of the main-nerves ; margins recurved ; 1.5 to 4.5 in. long, 1 to 2.5 in. broad ; midrib slender, impressed above, raised beneath ; main-nerves 4 to 6 pairs, arching upwards to and along the margin, raised beneath ; reticulations distinct on both sides ; petiole .1 to .25 in. long, pubescent, articulate in the middle. *Flowers* white, very fragrant, solitary or in 2-3-flowered terminal pubescent cymes ; bracteoles linear-subulate ; pedicels .25 in. long, pubescent. *Calyx*-tube campanulate, .1 in. long ; teeth 5 to 9, linear-subulate, .1 to .25 in. long. *Corolla*-tube slender, funnel-shaped, .5 in. long ; lobes 8 to 9, spreading, as long as tube, oblong acute or obtuse. *Stamens* included in the tube ; filaments short ; anthers oblong. *Ovary* rounded ; style slender ; stigmas 2, clavate. *Berry* didymous or with 1 carpel only by suppression ; carpels black, .25 in. in diam., sub-globose, surrounded by the sub-erect persistent calyx-teeth. Bot. Reg. t. 1 ; Bot. Mag. t. 1785 ; Wall. Cat. 2868 ; A.D.C. Prod. VIII. 301 ; Wight Ic. t. 704 ; Dalz. & Gibs. Bomb. Fl. 137 ; Brandis For. Fl. 311 ; Kurz in Journ. As. Soc.

Beng. XLVI. ii. 242, and For. Fl. II. 153; Clarke in Hook. f. Fl. Br. Ind. III. 591; Blume Bijdr. 677; Miq. Fl. Ind. Bat. II. 542; Cooke Bomb. Fl. II. 111; Prain Beng. Plants 659. *J. fragrans*, Salisb. Prod. 12. *J. undulatum*, Willd. Sp. Pl. I. 36 (not of Ker). *J. Sambac*, Roxb. Hort. Beng. 2, and Fl. Ind. Ed. Carey & Wall. I. 87. *J. quinqueflorum*, Heyne; Wall. Cat. 2878; A.D.C. l.c. 302. *J. pubescens*, Wall. Cat. 2880, not of Willd. *Nyctanthes Sambac* and *undulatum*, Linn. Sp. Pl. 8. *Mogorium Sambac*, Lamk. Dict. IV. 210; Ill. t. 6, fig. 1. *M. undulatum*, Lamk. Dict. IV. 212. "Kudda-mulla," Rheede Hort. Mal. VI. tt. 50, 51. Burm. Thes. Zeyl. t. 58, fig. 2.

PERAK: *Scortechini* 997.—DISTRIB. India, Ceylon, Burma, Siam.

Much cultivated in India and in all tropical regions. The cultivated forms have many-flowered cymes and rounded corolla-lobes, and they are often found with double flowers.

2. *JASMINUM GRIFFITHII*, Clarke in Hook. f. Fl. Br. Ind. III. 593 (1882). A slender climbing shrub; branchlets densely and patently fulvous-villous. *Leaves* chartaceous; ovate or elliptic-oblong, bluntly acute or acuminate at apex, rounded or cordate at base; fulvous-pilose on both surfaces, sparsely above, more densely beneath but glabrescent when old, the uppermost often whitened; 4 to 6 in. long, 1·5 to 3·5 in. broad; midrib prominent beneath; main-nerves 10 to 12 pairs, at first straight then arching upwards to join in a prominent looped intra-marginal nerve; secondary nerves few; reticulations rather indistinct; midrib and all nerves impressed above and pilose, raised and densely fulvous-villous beneath, tufted in the axils; petiole stout, ·2 to ·4 in. long. *Flowers* creamy-white, in terminal, many-flowered, fulvous-pilose cymes, 1 to 1·5 in. long and up to 2 in. broad; bracts leafy, lanceolate, about ·5 to 1 in. long, few; bracteoles many, linear, similar to calyx-lobes, of various lengths. *Calyx-tube* slender, ·1 in. long; lobes 5, linear, ·2 in. long. *Corolla-tube* slender, slightly enlarged above, ·75 in. long; lobes 5, spreading, ·25 in. long, elliptic, apiculate; lobes and tube minutely pubescent without. *Stamens* included or slightly exsert; filaments broad; anthers oblong-lanceolate with a broad connective, ·15 to ·2 in. long. *Ovary* glabrous; style slender; stigma clavate. *Berry* didymous; carpels waxy-white, globose, ·3 to ·4 in. in diam., pericarp crustaceous, glabrous. *Seed* usually one, testa fibrous; cotyledons thick, plano-convex, ·2 in. in diam.

PERAK: *King's Collector* 10229. MALACCA: *Griffith* (K.D.) 3704. SINGAPORE: *Ridley* 8455.

VAR. *cuspidata*, King & Gamble. *Leaves* thinner than in the type, oblong, abruptly and sharply cuspidate-acuminate at apex, attenuate and

abruptly rounded at base, 5 to 5.5 in. long, 1.5 to 2 in. broad, much less pilose, main-nerves 8 to 10 pairs; seeds 1 to 2, testa crustaceous.

PENANG: *Curtis* 2787. MALACCA: *Maingay* (K.D.) 998. JOHORE: at Gunong Palai, 1,400 feet, *G. King*.

3. *JASMINUM MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 594 (1882).

A climbing shrub; branchlets light brown, terete, internodes somewhat elongate, innovations and inflorescence tawny-pubescent. *Leaves* chartaceous; ovate or ovate-oblong, acuminate and often mucronate at apex, rounded or attenuate or cuneate at base; glabrous on both surfaces; margins recurved; 3 to 6 in. long, 2 to 2.5 in. broad; midrib stout; main-nerves 6 to 8 pairs, arching upwards to join in a looped intramarginal nerve about .2 in. from the margin; secondary nerves few; reticulations distant, obscure; all nerves strongly impressed above and raised beneath; petiole .5 to .7 in. long, articulate in the middle, twisted, the bases of each pair connected by a raised nodal line. *Flowers* in terminal or axillary, paniculate, tawny-pubescent, trichotomous cymes, 1.5 to 2 in. long, sessile or peduncled; bracts oblong or spatulate, leafy; bracteoles linear, about .25 in. long or less; pedicels blueish, .15 in. long; flowers white, sometimes slightly tinged with pink. *Calyx-tube* campanulate, .07 to .1 in. long; teeth 6, linear-subulate, .325 in. long. *Corolla-tube* slender, .5 to .7 in. long, glabrous; lobes 8 to 10, spreading, rotate, oblong-lanceolate, apiculate, .4 in. long, with prominent nerves. *Stamens* included in the corolla-tube; filaments slender, appressed to the tube; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindrical, glabrous; style slender, .4 to .5 in. long; stigma clavate. *Fruit* of one carpel, oblong, .5 in. long, .3 in. broad, exocarp thin shining, endocarp fibrous. *Seeds* 2, testa thin. Hook. f. Bot. Mag. t. 7823.

PENANG: *Maingay* (K.D.) 1000; *Curtis* 643. PERAK: *Scortechini* 139, 304; *Curtis* 2032; *King's Collector* 2761, 2762, 3975.—DISTRIB. Borneo (*Haviland & Hose* 911).

VAR. *kedahensis*, King & Gamble. *Branchlets* and inflorescence thickly rusty-pubescent. *Leaves* more ovate, rounded at base, nerves fewer, rarely 3 to 4 pairs, the two lower pairs very strong. *Drupe* nearly globose.

KEDAH: *Ridley* 5535.

A well-marked variety which may prove, when better known, to be a species.

4. *JASMINUM WRAYI*, King & Gamble, n. sp. A slender climbing shrub; branchlets pale brown, slender, terete. *Leaves* membranous; oblong or obovate-oblong, acuminate at apex, attenuate or rounded, sometimes slightly auricled at base; glabrous on both surfaces except



for tufts of tawny hairs in the axils of the main-nerves beneath; 3 to 7 in. long, 1.5 to 2.5 in. broad; midrib very slender, raised beneath; main-nerves about 7 pairs, curving upwards to and along the margin where they are obscurely connected in an intramarginal looped nerve, usually slightly impressed above and raised beneath; secondary nerves and reticulations obscure; petiole .3 to .5 in., slender, twisted. *Flowers* cream-coloured, in terminal, about 15–20-flowered corymbose cymes 2 to 3 in. long; peduncle 1 to 1.5 in. long, branches at right angles to rachis in fruit, .7 to 1 in. long; bracts lanceolate-acuminate, .5 in. long; bracteoles linear-subulate, .2 to .3 in. long; pedicels slender in flower, clavately-thickened in fruit and then .3 to .5 in. long. *Calyx-tube* very short; lobes 5, linear-subulate, spreading, curved, .25 in. long, glabrous or slightly pilose. *Corolla-tube* slender, .75 in. long, slightly enlarged above; lobes 8 to 9, narrow, .3 to .4 in. long. *Stamens* included in the corolla-tube; filaments short; anthers oblong, long-mucronate. *Ovary* cylindric, depressed; style slender; stigma slightly clavate. *Fruit* didymous; carpels ovoid-globose, greenish-white, .25 to .5 in. long, exocarp thin shining, endocarp fibrous. *Seed* 1, testa very thin, membranous; cotyledons plano-convex, thick.

PERAK: Wray 2297, 2905, 3147; *King's Collector* 1838, 2484.

VAR. *hispid*a, King & Gamble. Upper branchlets and inflorescence including calyx sparsely hispid, also midrib and main-nerves of leaves beneath; under-surface of leaves often pubescent; main-nerves up to 10 pairs.

PERAK: *King's Collector* 5893, on limestone hills. SELANGOR: *Curtis* 3774.

VAR. *axillaris*, King & Gamble. *Leaves* rather small, sparsely pubescent, especially on the midrib and main-nerves; inflorescence axillary, few-flowered (5 to 7), calyx hispid; fruit large, up to .5 in. in diam.

PERAK: on Maxwell's Hill, 3,000 feet—a slender climber, *Scortechini* 273.

5. *JASMINUM CURTISII*, King & Gamble, n. sp. A climbing shrub(?); branchlets slender, terete, minutely rusty-pubescent. *Leaves* membranous; ovate or ovate-oblong, acuminate at apex, rounded at base; glabrous on both surfaces except for pubescence on the nerves above and tufts of hair in the axils of the main-nerves beneath; 3 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 5 to 6 pairs, distant, curving upwards and joining in a looped nerve .1 to .2 in. from the margin, raised and prominent on both surfaces; secondary nerves and reticulations few, irregular; petiole .4 in. long, pubescent, twisted, articulate in the middle, the bases of each pair connected by a faint

nodal line. *Flowers* in a terminal trichotomous rusty-pubescent cyme, supported by pale (white?) leafy, ovate-lanceolate, pubescent bracts 1 to 1.25 in. long; bracteoles similar but smaller; pedicels .15 in. long; flowers in each cyme about 15 to 20. *Calyx-tube* campanulate, .15 in. long; lobes 6, linear-subulate, .5 in. long. *Corolla-tube* slender, cylindrical, 1 in. long; lobes 8 to 9, spreading or recurved, .5 in. long, oblong-lanceolate, acute. *Anthers* oblong, .125 in. long, mucronate. *Ovary* cylindric, glabrous; style slender; stigmas 2, clavate. *Fruit* not known.

PERAK: at Ipoh, *Curtis*.

A remarkable species, distinguished by the very long hair-like calyx-lobes and the coloured or white large leafy bracts and bracteoles.

6. *JASMINUM DECUSSATUM*, Wall. Cat. 2860 (1829). A climbing shrub; branchlets slender, densely rusty-pubescent. *Leaves* chartaceous; ovate or ovate-lanceolate, acuminate at apex, rounded at base; sparsely pubescent above, more densely so beneath; 2 to 4 in. long, 1 to 1.5 in. broad; midrib rather stout; main-nerves 4 to 5, lowest pair obscure, rest curved upwards to meet near the margin, impressed above, raised beneath; petiole .3 to .4 in. long, pubescent, articulate near the base, the bases of each pair of petioles (as also branchlets) joined by a raised nodal line on either side. *Flowers* in densely pubescent axillary and terminal trichotomous corymbose cymes about 1 to 2 in. long, supported by a pair of large leaf-like bracts; bracteoles linear-subulate; pedicels .1 to .2 in. long. *Calyx-tube* short; teeth 6, subulate, .1 in. long. *Corolla-tube* slender, .25 in. long; lobes 8 to 9, as long as tube, oblong-lanceolate, apiculate. *Stamens* included in the corolla-tube; filaments short; anthers oblong, .1 in. long, mucronate. *Ovary* rounded, glabrous; style slender, longer than the corolla-tube (in short-stamened flowers); stigmas two, clavate. *Fruit* of one ellipsoid carpel, .2 to .3 in. long, glabrous. A.DC. Prod. VIII. 306; Kurz in Journ. As. Soc. XLVI. ii. 241, and For. Fl. II. 151; Clarke in Hook. f. Fl. Br. Ind. III. 596.

PENANG: *King's Collector* 1425, at Trang, 100 to 300 feet.—DISTRIB. Burma (*Wallich* 2860, *Griffith* 3699).

7. *JASMINUM BIFARIUM*, Wall. Cat. 2866 (1829). A climbing shrub; branchlets slender, terete, brown when dry, pubescent or nearly glabrous. *Leaves* chartaceous, usually bifarious; ovate or ovate-oblong, acuminate at apex, rounded or truncate sometimes almost cordate at base; pubescent or sometimes nearly glabrous on both surfaces; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, pubescent, impressed above, raised beneath; main-nerves 4 to 6 pairs, pubescent, prominent beneath, arched upwards to join in an intramarginal nerve; secondary nerves and reticulations very obscure; petiole .2 to .3 in. long, twisted, articu-

late in the middle, the bases of each pair connected (as are the branchlets) on either side by a raised nodal line. *Flowers* white, in few- (4-12-) flowered, pubescent, sub-capitate cymes, sub-sessile in the axils of the two uppermost bract-like leaves; bracteoles linear-subulate, .15 in. long; pedicels .1 in. long. *Calyx-tube* campanulate; teeth 5 to 7, linear-subulate, .1 to .15 in. long. *Corolla-tube* slender, cylindric, .6 to .8 in. long; lobes 6 to 9, ovate-oblong, spreading, apiculate, .2 to .3 in. long. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .1 to .15 in. long, connective broad. *Ovary* cylindric, glabrous; style slender, exsert; stigmas 2, clavate. *Fruit* a didymous berry; carpels ovoid, .5 in. long, .2 in. broad; exocarp membranous shining, endocarp fibrous. *Seed* conform to carpel, testa very thin, membranous. A.D.C. Prod. VIII. 305; Clarke in Hook. f. Fl. Br. Ind. III. 595. *J. bracteatum*, Wall. Cat. 2867. *J. nummularoides*, Blume Mus. Lugd. Bat. I. 275; Miq. Fl. Ind. Bat. II. 537.

PENANG: Wallich 2866, 2867; Curtis 1920; Ridley 9361. PERAK: Wray 4180; King's Collector 860, 4920, 10699; Deschamps; Scortechini 59, 144, 238. SELANGOR: Ridley 7550, 8567. PAHANG: Ridley in Trans. Linn. Soc., Ser. 2, III. 319.—DISTRIB. Java.

VAR. *glabra*, Clarke in Hook. f. Fl. Br. Ind. III. 595. *Leaves* larger, elliptic, rhomboid or rounded at the base, more glabrous, less bifarious; calyx-teeth rather longer. *J. Lessertianum*, A.D.C. Prod. VIII. 304.

JUNKSEYLO (Tongka): Curtis 2911. PENANG: Maingay (K.D.) 999; Deschamps. PERAK: Wray 4180; Scortechini; Kunstler 122. MALACCA: Griffith (K.D.) 3708; Goodenough 1995. JOHORE: Ridley 4217. SINGAPORE: Lobb; Ridley 10760.—DISTRIB. Sumatra.

8. *JASMINUM ADENOPHYLLUM*, Wall. Cat. 2876 (1829). A very slender wiry climber; branchlets extensively twining, glabrous. *Leaves* membranous; ovate-lanceolate to elliptic-oblong, variable, acuminate and mucronate at apex, cuneate at base; glabrous above except on the midrib, glabrous beneath except the tuft of tawny hairs in the axils of the main-nerves; margins somewhat undulate; 1.5 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves very slender, obscure, about 6 pairs, curving upwards to meet in a faint intramarginal looped nerve; petiole slender, twisted, articulate in the middle, .2 to .3 in. long, hispid. *Flowers* white, solitary, or 2 to 3 together in a slender, sometimes leafy, umbel from the axils of the leaves; peduncle .75 to 1.25 in. long, flattened above and with a pair of opposite bracts near the middle; bracts of umbel 2, linear-subulate, .3 in. long; pedicels very slender, .75 to 1 in. long, clavately enlarged in fruit. *Calyx-tube* campanulate, glabrous, ribbed, .1 in. long; lobes linear-subulate, keeled on the back,

sparsely hispid, .4 to .5 in. long, points recurved. *Corolla-tube* slender, funnel-shaped, .75 in. long; lobes as long or slightly longer, 8 to 9, recurved, oblong-ligulate, about .25 to .3 in. broad. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindric; style slender; stigma clavate. *Fruit* globose, shining, young carpels .25 in. in diam. A.DC. Prod. VIII. 314; Clarke in Hook. f. Fl. Br. Ind. III. 597.

PENANG: *King's Collector* 1736.—DISTRIB. Khasia Hills (*Wallich*).

This species is clearly quite a small climber, and while the Penang specimens have only small leaves those from the Khasia Hills show comparatively large ones, but this is not unnatural, and we believe the identification to be correct.

9. *JASMINUM LONGIPETALUM*, King & Gamble, n. sp. A large climbing shrub, reaching 30 to 40 feet; branchlets slender, terete, pale brown. *Leaves* chartaceo-coriaceous, 3-nerved; elliptic, acute or shortly acuminate at apex, attenuate or cuneate or slightly rounded at base; glabrous on both surfaces; margins slightly recurved; 2 to 6 in. long, 1.5 to 3 in. broad; midrib slightly impressed above, shortly raised beneath; main-nerves 7 to 8 pairs, the basal pair opposite, at about 25° with the midrib produced in an intramarginal nerve about .25 in. from the margin, looped where the others, which are at about 65° with the midrib, join it; secondary nerves and reticulations very indistinct; petiole .2 to .4 in. long, twisted. *Flowers* white tinged with pink, fascicled 3 to 6 together in the axils of the upper leaves, forming sessile umbellate cymes; bracts very small, ovate-acute, deciduous; pedicels 1 to 1.5 in. long, very slender, summit enlarged in fruit. *Calyx-tube* short; lobes 6, glabrous, linear-subulate, .1 in. long, margins inflexed. *Corolla-tube* very slender, .75 in. long; lobes 9, linear-oblong, acute, 3-5-nerved, .75 to 1 in. long, much recurved in flower. *Stamens* within the tube; filaments short, slender; anthers oblong, .175 in. long, obtuse. *Ovary* glabrous, 2-celled; style slender; stigma flattened, minutely pubescent. *Fruit* didymous; carpel usually 1 only by suppression, black, globose, .4 to .5 in. in diam.; pericarp fleshy, glabrous. *Seeds* 2, testa very thin, cotyledons plano-convex.

PERAK: *King's Collector* 2765, 6005—on rich soil at 300 to 800 feet elevation, scarce. SINGAPORE: *Ridley* 10937.

A particularly handsome and well-defined species, which is well worthy of garden cultivation.

10. *JASMINUM SMILACIFOLIUM*, Griff. MS., Clarke in Hook. f. Fl. Br. Ind. III. 600 (1882). A large glabrous climbing shrub; branchlets pale brown, terete. *Leaves* coriaceous, 3-nerved; ovate, abruptly caudate-

acuminate at apex, obtuse or nearly cordate at base; margins entire, recurved; 5 to 7 in. long, 3 to 4 in. broad; midrib very prominent, impressed above, much raised beneath; two lowest main-nerves very prominent, similar to the midrib, curved upwards to form a pair of intramarginal nerves meeting at the apex; remaining main-nerves irregular, 3 to 4 pairs, inconspicuous; secondary nerves and reticulations raised above; petiole .75 in. long, twisted, articulate in the middle. *Inflorescence* of axillary 5–20-flowered cymes; rachis jointed, terete; bracts spatulate, .1 to .2 in. long; bracteoles smaller, linear; pedicels .2 to .3 in. long, greatly enlarged in fruit; flowers white, tinged with pink. *Calyx* campanulate, tube .15 in. long; teeth 5, .05 in. long. *Corolla-tube* slender, cylindrical, .75 to 1 in. long; lobes oblong, acute or apiculate, .75 in. long, .2 in. broad. *Stamens* inserted in the throat of the tube; filaments short; anthers linear-oblong, .25 in. long, mucronate. *Drupe* didymous; carpels ellipsoid, .1 in. long, .3 to .4 in. broad, smooth, shining.

MALACCA: *Griffith* (K.D.) 3698; *Maingay* (K.D.) 997.

11. *JASMINUM INSIGNE*, Blume Mus. Bot. Lugd. Bat. I. 278 (1849).

An extensively climbing shrub; branches obscurely quadrangular with pale-grey corky bark; branchlets acutely quadrangular, glabrous, the edges pale-corky-winged. *Leaves* chartaceo-coriaceous; opposite, occasionally whorled; elliptic or elliptic-oblong, acute at apex, cuneate at base; glabrous on both surfaces; margins recurved; 2 to 8 in. long, 1 to 4 in. broad; midrib slender, raised beneath; main-nerves 6 to 7 pairs, the basal pair faint, opposite, at about 30° with the midrib, produced in an intramarginal nerve .1 to .2 in. from the margin, looped where the others, which are at 50° to the midrib, join it; secondary nerves and reticulations obscure; petiole .4 to 1.2 in. long, twisted, the upper part bordered for a short distance by the decurrent margins of the blade. *Flowers* white, in compact, many-flowered, glabrous cymes from the axils of the leaves or (more usually) from the stem; bracteoles subulate, .1 to .15 in. long, caducous; pedicels stout, .2 in. long, somewhat angular. *Calyx-tube* campanulate, .25 in. long; lobes 4 to 5, linear-subulate, unequal, .25 to .35 in. long, points hooked. *Corolla-tube* slender, .75 to 1 in. long, somewhat inflated above; mouth slightly thickened; lobes 4 to 5, spreading, ovate-oblong, apiculate, .5 in. long, .3 to .4 in. broad. *Stamens* in the tube of the corolla; filaments flattened; anthers oblong, mucronate, .25 to .3 in. long. *Ovary* glabrous, rounded; style slender, clavate, obscurely cleft in 2 short stigmas; cells 2. *Fruit* didymous; carpels oblong, smooth, white when ripe. *Miq. Fl. Ind. Bat. II.* 541. *J. cauliflorum*, Scortechini MS. in Herb. Calcutta.

PERAK : at Theripay Taipay, *Scortechini*; Wray 2840; Cantley 23; *King's Collector* 2890, 3398, 7059.—DISTRIB. Sumatra, *Forbes* 2906.

A very fine species of well-marked characters.

12. *JASMINUM SCORTECHINII*, King & Gamble, n. sp. A slender climbing shrub, reaching 60 feet in length; branchlets dark-coloured, glabrous. *Leaves* thin when young, almost coriaceous when old, 3-sometimes 1-foliolate, opposite or sub-opposite; terminal leaflet ovate or lanceolate, acuminate at apex, rounded at base; glabrous on both surfaces, upper surface shining, nearly black when dry, lower surface dull, reddish when dry; 2·5 to 4 in. long, 1 to 1·5 in. broad; lateral leaflets similar but slightly smaller and often lanceolate; midrib slender, raised beneath; main-nerves very indistinct, apparently 6 to 8 pairs; petiole ·75 in. long, petiolule of end leaflet ·5, of side leaflets ·3 in. long, all grooved, slender, articulate below the leaflet. *Flowers* white, in axillary or terminal trichotomous cymes, terminal ones often paniculate; peduncles ·5 to 1 in. long; bracts ovate-acute or subulate, ·1 in. long; cymes sparsely scaly; bracteoles at the base of the calyx minute; pedicels ·1 to ·2 in. long, very much enlarged in fruit and then reaching ·5 to ·7 in. in length and ·3 in. in diam. at top. *Calyx-tube* campanulate, ·125 in. long; teeth 5, very short, triangular. *Corolla-tube* slender, enlarged above, ·4 to ·6 in. long; lobes 5, ovate-cordate, obtuse, ·3 to ·4 in. long, spreading. *Stamens* included in the corolla-tube; filaments short; anthers oblong, mucronate, ·15 in. long, connective broad. *Ovary* cylindrical, glabrous, 2-celled; style slender, as long as the corolla-tube; stigma clavate. *Fruit* didymous; carpels ellipsoid, ·75 to 1 in. long, ·5 in. broad; pericarp thin, crustaceous, blackish-brown. *Seed* nearly filling the cavity; testa thin, fragile; cotyledons oblong-obtuse, slightly auricled at base, ·5 to ·6 in. long by ·25 in. broad, plano-convex.

PENANG : *Curtis* 1227, 2031. PERAK : *Scortechini* 383, 479; *Ridley* 10679; *King's Collector* 7006, 7009; *Curtis* 169.

The description is largely after *Scortechini* MS. The species comes very near *J. lanceolaria*, Roxb., but differs in its more slender habit, thinner leaves, and large ellipsoid carpels.

*Ridley's* No. 8325 from Lankawi Island, Kedah, is a twiggy, apparently erect shrub with trifoliolate leaves, the leaflets all obovate-orbicular emarginate, the end one reaching 1·7 in. long and 1·3 in. broad, the side ones only about ·6 in. long and broad. The fruits are of one carpel about the size of a small pea, and the flowers are unknown. It may possibly not be a *Jasminum* (Herb. Kew).

The following species from Borneo is of interest, and may perhaps be found later on in the Peninsula :—

*JASMINUM SARAWACENSE*, King & Gamble, n. sp. A climbing shrub; branchlets pale brown, terete; internodes rather long. *Leaves* opposite, chartaceous; elliptic-

oblong, long-acuminate at apex, cuneate at base; both surfaces glabrous; margins recurved; 4 to 7 in. long, 1.75 to 2.75 in. broad; midrib strong, impressed above, raised beneath; main-nerves 4 pairs, the lowest pair near the margin at an angle of about 30° with the midrib, the remaining pairs at about 50°, curving upwards to meet in an intramarginal looped nerve, which is also met by secondary nerves above the fourth pair; reticulations irregular, not prominent; petiole .5 to .75 in. long, twisted in the middle. *Inflorescence* of axillary, long-peduncled, trichotomous, pubescent, corymbose cymes, about 1 in. broad at top, usually 1 pair from each node; peduncle terete, 2 to 3 in. long, sometimes branched, minutely pubescent; branches very short, .2 in. long; pedicels clavate, .1 to .15 in. long; bracts and bracteoles linear-subulate, .25 in. long, one pair of bracteoles to each terminal fascicle of 3 flowers; flowers white, buds clavate, 1 in. long. *Calyx-tube* campanulate, .15 in. long; lobes 6, linear-oblong, applicately infolded at the middle inwards, .15 to .2 in. long, pubescent. *Corolla-tube* cylindrical, 1 in. long; lobes 6, spreading, oblong, rounded at top, .4 to .5 in. long, prominently 3-5-nerved. *Stamens* 2, inserted at about the middle of the tube within; filaments short, decurrent within the tube; anthers linear-oblong, .2 in. long. *Ovary* cylindric, truncate and depressed at top, 2-celled; style very slender; stigma clavate. *Fruit* not known.

BORNEO: near Kuching in Sarawak, *Haviland & Hose* 3489.

## 2. OSMANTHUS, Lour.

Trees or shrubs, glabrous. *Leaves* opposite, evergreen, entire or dentate. *Flowers* small, axillary or terminal, fascicled or in very short racemes, hermaphrodite or polygamous. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short or long; lobes 4, broad, obtuse, imbricate. *Stamens* 2, more rarely 4, inserted on the corolla-tube; anthers ovate, sub-extrorsely dehiscent. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short or cylindric, 2-lobed or sub-entire. *Drupe* ovoid or globose; exocarp fleshy, endocarp bony or crustaceous. *Seeds* usually solitary, pendulous; testa thin; albumen fleshy; cotyledons flat; radicle short, superior.—DISTRIB. N.W. Himalaya and eastwards to China and Japan, also in Western North America; about 8 to 10 species.

OSMANTHUS SCORTECHINII, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height, and 10 to 15 in. in diam. of stem; branchlets terete with pale grey, somewhat corky, bark. *Leaves* coriaceous; lanceolate, shortly acuminate at apex, cuneate at base; both surfaces glabrous; margins entire, recurved; 2 to 4 in. long, .75 to 1.25 in. broad; midrib thick, impressed above, raised beneath; main-nerves very obscure, about 5 to 6 pairs; petiole broad, .3 to .6 in. long, channelled above and bordered by the decurrent margins of the blade. *Flowers* in very short, close, axillary racemes, reaching .5 in. long in fruit, supported by a pair of ovate, acute, coriaceous bracts; pedicels slender, .05 in. long. *Calyx* membranous, .06 in. long; lobes 4, slightly serrate. *Corolla* campanulate, tube .05 in. long; lobes .1 in. long, oblong, obtuse, margins incurved.

*Stamens* 4, slightly exsert, inserted between the corolla-lobes at the top of the tube; filaments slender; anthers small, ovate, cells dehiscing on the margins or somewhat extrorsely. *Ovary* conical, glabrous; style slender, subulate, .04 in. long; cells 2, ovules in each cell apparently 2. *Drupe* globose, .2 to .3 in. in diam.; dark greenish-blue when ripe, exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa membranous; albumen fleshy, ruminate; cotyledons oblong, flat, narrow; radicle superior.

PERAK: *Scortechini* 414—at Thaipeng; *Wray* 682; *King's Collector* 5029, 6978.

The structure of the wood, so far as the examination of a very small branch goes, confirms the placing of this plant in the genus *Osmanthus*.

To this species seems also to belong *King's Collector* 3663, which has a bright red drupe reaching .5 in. in length, slightly ribbed and with a spatulate embryo having the radicle nearly as long as the cotyledons, each .1 in. It may be called *Var. oblonga*.

### 3. LINOCIERA, Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* small, in axillary or extra-axillary, rarely terminal, panicles or cymes; bracts generally small, sometimes rather enlarged and leafy; bracteoles very small. *Calyx* small, 4-fid or -toothed. *Corolla* of 4 petals, long or short, nearly free or cohering by pairs or very shortly connate, induplicate-valvate in bud. *Stamens* 2, rarely 4, inserted at the base of the petals and usually between the two cohering ones; filaments short; anthers elliptic or oblong, dehiscing on the margin or slightly extrorse; connective broad, often apiculate. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short; stigma bifid or entire. *Drupe* globose or ellipsoid; exocarp fleshy, thin, endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albumen fleshy or 0, if fleshy the cotyledons flattened, radicle superior.—*DISTRIB.* Tropics of both hemispheres, species about 40.

Leaves over 4 in. long, main-nerves prominent beneath:—

Panicles 4 to 6 in. long, drupe .75 in. long	..	..	1. <i>L. pauciflora</i> .
Panicles 2 to 4 in. long, drupe 1.7 in. long	..	..	2. <i>L. macrocarpa</i> .
Panicles 1.5 to 2 in. long, drupe not known	..	..	3. <i>L. paludosa</i> .

Leaves under 4 in. long, main-nerves obscure beneath, cymes scarcely 1 in. long	..	..	..	..	4. <i>L. caudata</i> .
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1. *LINOCIERA PAUCIFLORA*, Clarke in Hook. f. Fl. Br. Ind. III. 609 (1882). A small tree, reaching 30 to 40 feet in height and 1.5 to 2 feet in diam. of stem; branches moderately stout, pale grey, smooth, swollen at the nodes, internodes slightly angular; branchlets darker coloured,



slender; leaf-buds linear-lanceolate. *Leaves* coriaceous; elliptic-oblong, rounded or shortly obtusely acuminate at apex, cuneate at base; glabrous on both surfaces, but with prominent raised glandular papillæ; 4 to 9 in. long, 2 to 4 in. broad; midrib stout, slightly impressed above, prominently raised beneath; main-nerves 11 to 13 pairs, fairly prominent and regular, curving upwards to and along the margin near which they anastomose; secondary nerves and reticulations obscure; petiole .7 to 1.3 in. long, thickened at base. *Flowers* pale yellow or white, in compound axillary panicles, 4 to 6 in. long; main branches 1 to 2 in. long; rachis slender, glabrous, somewhat angular; bracts leafy, ovate or spatulate, .5 to 1 in. or sometimes longer; bracteoles ovate-acute, very small; pedicels slender, .05 to 1.5 in. long, much thickened and pale in fruit even when quite young. *Calyx-tube* short; teeth 4, ovate-acute, .05 in. long. *Corolla-lobes* in two pairs, oblong, .1 to .15 in. long; slightly hairy within. *Stamens* .05 in. long; filaments short, broad, anthers elliptic, emarginate, with a gland on the front of the connective. *Drupe* ellipsoid, .75 in. long, .3 to .4 in. broad, blueish-black when ripe; exocarp fleshy, endocarp thin, crustaceous. *Seed* 1, testa pergamaceous; albumen none; cotyledons fleshy, .55 in. long; radicle very small, superior. *Olea* (?) *pauciflora*, Wall. Cat. 2812; A.DC. Prod. VIII. 288. *Chionanthus palembanica*, Miq. Fl. Ind. Bat. Suppl. 558; Kurz For. Fl. II. 159, and Journ. As. Soc. Beng. XLVI. ii. 243.

KEDAH: *Curtis*. PENANG: *Wallich* 2812A, B; *G. King*; *Curtis* 695, 2773; *King's Collector* 1693; *Ridley* 10178. PERAK: *Ridley* 7160; *Scortechini* 952; *King's Collector* 4172, 4834. SINGAPORE: *Ridley* 5079. —DISTRIB. Tenasserim, Andamans, Borneo (*Haviland* 1766).

2. *LINOCIERA MACROCARPA*, King & Gamble. A small tree; branchlets pale greyish-brown, stout, lenticellate; innovations ashy-pubescent. *Leaves* coriaceous; obovate-oblong or obovate-lanceolate, obtuse or very shortly and bluntly acuminate at apex, long cuneate at base; glabrous on both surfaces; margins entire or slightly recurved; 6 to 10 in. long, 2 to 3.5 in. broad; midrib very stout, broad and plane above, much raised beneath; main-nerves 14 to 17 pairs, prominent beneath, curved only near the margin to meet in a faint looped intramarginal nerve; secondary nerves and reticulations obscure; petiole 1 to 1.5 in. long, enlarged at base. *Flowers* in ashy-pubescent panicles, 2 to 4 in. long; bracts leafy, sometimes oblong-lanceolate, more generally spatulate; bracteoles linear-subulate, short; pedicels variable, often 0; rachis and pedicels much enlarged in fruit. *Calyx* pubescent; tube short; lobes ovate-acute, .05 in. long. *Corolla-tube* very short; lobes oblong-linear, .1 to .15 in. long, margins much incurved. *Stamens* .075 in. long; anthers oblong; filaments very short,

connective produced in a conical acumen. *Ovary* pubescent; style short; stigma 2-lobed. *Drupe* oblong-ellipsoid, 1·7 in. long, 1 to 1·2 in. broad; exocarp thick, granular; endocarp hard, ·15 in. thick, obscurely ridged outside. *Seed* 1, testa membranous, albumen fleshy. *L. insignis*, Clarke in Hook. f. Fl. Br. Ind. III. 610. *Chionanthus macrocarpa*, Blume Mus. Bot. I. 319 (1849); Koord. & Val. Bijdr. VIII. 239. *C. insignis*, Miq. Fl. Ind. Bat. Suppl. 559 (1862). *C. montanus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 243, and For. Fl. II. 159.

SINGAPORE: at Bukit Mandai, *Ridley* 4580.—DISTRIB. Tenasserim (*Helfer* (K.D.) 3688), Martaban (*Kurz*), Sumatra (*Teysmann*, *Beccari* 826), Borneo (*Beccari* 725).

3. *LINOCIERA PALUDOSA*, King & Gamble, n. sp. A small tree (*Wray*), large tree, 60 to 80 feet high, and 15 to 20 in. in diam. of stem (*King's Collector*); branchlets thick, pale greyish-brown. *Leaves* coriaceous; oblong, bluntly acute at apex, also at base; glabrous on both surfaces except on the nerves which are minutely pubescent; margins recurved; 6 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, slightly raised above, strongly so beneath main-nerves 11 to 15 pairs, impressed above, prominently raised beneath, ·75 to 1 in. apart, at first straight then curving upwards to and along the margin to anastomose and form a prominent looped intramarginal nerve; secondary nerves few; reticulations transverse, not prominent; petiole stout, wrinkled, ·5 in. long. *Flowers* yellow, with a brown centre, in pubescent panicles 1·5 to 2 in. long from the branchlets between the leaf-nodes in the axils of small tubercles; peduncles stout, grey-pubescent, ·2 in. long; bracts ovate, grey-pubescent; bracteoles ovate-acute, recurved; pedicels 0·5 in. long. *Calyx-tube* short, lobes ovate-acute or triangular, ciliate, ·025 in. long, one lobe sometimes enlarged. *Corolla-lobes* in 2 pairs, linear-oblong, obtuse, ·2 in. long, ·05 in. broad, glabrous. *Stamens* ·05 in. long; filaments broad, short; anthers rounded, connective with an obscure gland. *Ovary* conical, glabrous; style short; stigmas 2. *Fruit* not known.

PERAK: at Sungie Larút, *Wray* 2424; on low wet ground, *King's Collector* 6476.

4. *LINOCIERA CAUDATA*, King & Gamble, n. sp. A tree, reaching 30 to 40 feet in height and 5 to 7 in. in diam. of stem; branches slender, pale grey, ultimate branchlets darker. *Leaves* chartaceous; lanceolate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 3 to 4 in. long, 1 to 1·25 in. broad; midrib slender, raised above, scarcely raised beneath; main-nerves very obscure, about 4 to 5 pairs, curving sharply upwards to meet in an intramarginal looped nerve; petiole ·1 to ·2 in. long, grooved above.

*Flowers* in axillary or extra-axillary, few-flowered, trichotomous, paniculate cymes about 1 in. long; rachis glabrous, somewhat angular; bracts and bracteoles small, ovate, acute. *Calyx* .05 in. long, tube short; lobes 4, ovate, obtuse. *Corolla-tube* scarcely any; lobes in 2 pairs, oblong, .1 in. long. *Stamens*: filaments broad; anthers oblong, cells extrorsely dehiscent; connective apiculate. *Ovary* glabrous, conical; style very short; stigma bifid. *Drupe* (immature) obovoid, .3 to .4 in. long, seed apparently albuminous.

PERAK: *King's Collector* 3212, 6857, in dense jungle on high mountains at 3,500 to 4,000 feet.

This species is rather near *L. monticola*, Bl., but the leaves are narrower and the inflorescence longer.

#### 4. OLEA, Linn.

Trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* small; hermaphrodite, dioecious or polygamous; in axillary, rarely terminal trichotomous panicles; bracts small. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short; lobes 4, induplicate-valvate, sometimes 0. *Stamens* 2, on the corolla-tube or sub-hypogynous; filaments short; anthers ovate or oblong, cells dehiscent on the margin or slightly extrorse, in ♂ flowers sometimes introrse. *Ovary* 2-celled; ovules 2 in each cell, attached laterally to the septum or sub-pendulous; style short; stigma obtuse, capitate or bifid. *Drupe* ellipsoid or sub-globose; exocarp fleshy; endocarp bony or crustaceous, usually 1-seeded. *Seed* pendulous; testa thin; albumen fleshy, sometimes slightly ruminant; cotyledons flat, radicle superior.—DISTRIB. South Europe and Asia, tropical and South Africa, New Zealand; about 35 species.

Inflorescence more than 3 in. long; leaves oblong lanceolate, acute, usually over 4 in. in length. . . . . 1. *O. dentata*.

Inflorescence under 3 in. long; leaves elliptic-lanceolate, acuminate, under 4 in. in length. . . . . 2. *O. maritima*.

#### SPECIES IMPERFECTLY KNOWN.

Leaves 8 to 14 in. long; inflorescence extra-axillary on old wood; drupes flattened. . . . . 3. *O. platycarpa*.

Leaves 2 to 3 in. long; inflorescence axillary or extra-axillary on young wood; corolla-lobes linear, .1 in. long; drupes not known. . . . . 4. *O. ardisioides*.

1. *OLEA DENTATA*, Wall. Cat. 2840 (1829). A tree, 40 to 60 feet high; branchlets light brown, smooth, innovations minutely pubescent. *Leaves* coriaceous; oblong-lanceolate, bluntly acute at apex, cuneate or rounded at base; glabrous on both surfaces, but when young pubescent on the nerves beneath; margins entire or distantly dentate, slightly recurved; 3.5 to 5.5 in. long, 1 to 2 in. broad; midrib slender, im-

pressed above, raised beneath; main-nerves obscure, 8 to 10 pairs, arching upwards to join in a looped nerve near the margin, impressed above; petiole .4 in. long. *Flowers* in axillary or extra-axillary, leafy, tri-pinnate, minutely pubescent, paniculate cymes, 3 to 6 in. long, branches trichotomous, ultimate cymes umbellate; bracts leafy, oblong or lanceolate, .5 to 1.5 in. long; pedicels slender, .05 to .1 in. long; bracteoles minute, ovate-acute. *Calyx* minutely pubescent, .05 in. long; lobes 4, ovate, obtuse. *Corolla* tubular-campanulate, .15 in. long; lobes 4, rounded, .05 in. long. *Stamens* very small, inserted at the base of the corolla-tube; filaments very short; anthers ovoid, sub-extrorsely dehiscent. *Ovary* ovoid; style none; stigma capitate; cells 2, ovules 2 in each cell. *Drupe* not seen. A.DC. Prod. VIII. 286; Kurz in Journ. As. Soc. Beng. XLVI. ii. 245, and For. Fl. II. 157; Clarke in Hook. f. Fl. Br. Ind. III. 613.

PENANG: *Curtis* 222, 950, 2267.—DISTRIB. Burma.

2. *OLEA MARITIMA*, Wall. Cat. 2813 (1829). A large shrub or small tree; branchlets terete, pale brown; innovations minutely pubescent. *Leaves* coriaceous; elliptic-lanceolate, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces; margins entire or distantly serrate on their upper half; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, impressed above, raised beneath; main-nerves obscure, 7 to 10 pairs, meeting near the margin in a looped intramarginal nerve; reticulations scanty; petiole .2 to .3 in. long, minutely pubescent when young, finally glabrous. *Flowers* dull white, polygamous, in slender, minutely pubescent, trichotomous paniculate cymes with few branches; ultimate cymes umbellate, usually .75 to 1 in. long in flower, up to 1.5 in. long in fruit, rarely axillary, usually extra-axillary; each pair of peduncles supported by a pair of ovate lanceolate leafy bracts .3 to .5 in. long; common peduncles .7 in. long; pedicels .05 to .1 in. long, bracteoles none. *Calyx* .05 in. long, minutely rusty-pubescent; tube short; lobes 4, ovate-acute, as long as tube. *Corolla* campanulate, .1 to .15 in. long; lobes 4, obtuse, as long as tube, induplicate-valvate, apparently absent in ♀. *Stamens* .07 in. long, inserted near the base of the corolla-tube; filaments slender; anthers as long as filaments, reniform, cells sub-extrorsely dehiscing. *Ovary* conical; style none; stigma capitate; cells 2, ovules in each cell pendulous. *Drupe* globose, .2 in. in diam., black when ripe, wrinkled when dry; exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa very thin, albumen copious; cotyledons elliptic, nearly .1 in. long; radicle somewhat thick. G. Don Gen. Syst. IV. 49; A.DC. Prod. VIII. 288; 288; Clarke in Hook. f. Fl. Br. Ind. III. 612; Miq. Fl. Ind. Bat. II. 547.

MALACCA: *Griffith* (K.D.) 3679; *Maingay* (K.D.) 1022; *Cuming* 2318; *Ridley* 3284, 10731. PAHANG: a common bush on the sandy heaths, *Ridley* in Trans. Linn. Soc. Ser. 2. III. 319. SINGAPORE: *Wallich* 2813; *Walker* 183; *Ridley* 3616A, 8420; *King's Collector* 1138; *Murton* 62.—DISTRIB. Malay Islands.

## SPECIES IMPERFECTLY KNOWN.

3. *OLEA PLATYCARPA*, King & Gamble, n. sp. A small tree with spreading branches, reaching 25 to 30 feet in height; branchlets stout, pale brown, smooth, marked by the prominent horse-shoe-shaped scars of fallen leaves. *Leaves* coriaceous; obovate-oblong or oblong-lanceolate, abruptly acuminate at apex, cuneate at base; glabrous on both surfaces and with scattered glands; margins entire, slightly recurved; 8 to 14 in. long, 3 to 5 in. broad; midrib very stout and prominent; main-nerves 14 to 16 pairs, curving upwards to join in a looped intramarginal nerve close to the margin; secondary nerves few; reticulations irregular, obscure; petiole 1 in. long, base enlarged, wrinkled. *Flowers* diœcious, in extra-axillary, sessile, paniculate, trichotomous cymes, usually on old wood, 1 to 1.5 in. long, supported by a cluster of sheathing scarious bracts; bracts of panicle branches and bracteoles ovate-acute; pedicels very short, stout, somewhat angular. *Calyx* short, .05 in. long; teeth (in ♀ flowers) ovate, obtuse, ciliate. *Corolla* none in ♀, ♂ not seen. *Ovary* conical, rugose; style 0; stigma 2-lobed, mitriform. *Drupe* ovate-oblong, flattened, .7 in. long, .5 in. broad; exocarp thick, wrinkled when dry; endocarp thick, granular; cells 2. *Seed* 1, pendulous from the summit of the thin central persistent septum; testa membranous; albumen thick, fleshy; cotyledons ovoid, .15 in. long, radicle rather stout.

PERAK: at low levels on the hills, *King's Collector* 5541, 7649; *Hervey*.

The absence of male flowers renders the identification of the genus of this plant somewhat uncertain, but we consider it belongs rightly to *Olea*.

4. *OLEA ARDISIODES*, King & Gamble, n. sp. A small tree; branches slender, terete, with yellowish bark; branchlets minutely pubescent. *Leaves* coriaceous; lanceolate, long acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 2 to 3 in. long, .6 to .1 in. broad; midrib slender, impressed above, raised beneath; main-nerves 5 pairs, curving upwards to meet in a looped intramarginal nerve, obscure; secondary nerves and reticulations very obscure; petiole slender, .1 to .2 in. long. *Flowers* in axillary or extra-axillary

slender paniculate cymes, 1 to 2 in. long; rachis somewhat angular, minutely pubescent; bracts leafy, lanceolate, .5 to 1 in. long; bracteoles similar or sometimes subulate-spathulate; pedicels slender, .1 in. long, reflexed. *Calyx-tube* very short; lobes 4, ovate-acute, .025 in. long, ciliate. *Corolla-tube* .03 to .05 in. long; lobes 4, induplicate-valvate, linear, .1 in. long. *Stamens* 2, inserted at the base of the corolla-tube, .05 in. long; filaments slender; anthers elliptic, cells dehiscing laterally, connective mucronate. *Ovary* conical; style 0; stigma minute, bifid; cells 2. *Fruit* not seen.

PERAK: on Gunong Bubu, 5,000 feet, Wray 3871. PAHANG: Barnes 10896.

We have hesitated whether to describe this species as *Olea* or *Linociera*, for the corolla-tube is not very long, and the lobes are like those of the latter genus, but the character of the leaves is distinctly that of *Olea*.

### 5. MYXOPYRUM, Blume.

Large scandent shrubs with quadrangular branches. *Leaves* opposite, large, triplinerved, entire or denticulate. *Flowers* small, yellow, very numerous, in axillary and terminal trichotomous panicles. *Calyx-tube* short, lobes 4. *Corolla* fleshy; tube urceolate; lobes 4, concave, induplicate-valvate in bud. *Stamens* 2, inserted on the base of the corolla-tube; filaments very short; anthers rather large, ovate, cells dehiscing laterally. *Ovary* 2-celled; style very short or 0, stigma 2-lobed; ovules 1 to 2 in each cell, attached near the base at the inner angle. *Fruit* a 1-2-seeded sub-globose berry; pericarp crustaceous. *Seeds* 1 to 4, erect, testa membranous, albumen thick; cotyledons flat, ovate, radicle inferior.—DISTRIB. India and Malaya, 3 species.

MYXOPYRUM NERVOSUM, Blume Bijdr. 683 (1826). A large climbing shrub; branches with fibrous pale brown bark; branchlets prominently quadrangular. *Leaves* coriaceous; elliptic or elliptic-oblong or elliptic-lanceolate, acuminate at apex, cuneate or rounded at base; glabrous on both surfaces; margins entire or denticulate in the upper half, prominently recurved; 4 to 7 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent beneath, impressed above; main-nerves 4 to 6 pairs, the lowest pair opposite, very prominent, starting a little above the base and forming an intramarginal nerve looped only after where it meets the rest at about two-thirds of the way up, the next pair not opposite and only starting from about half the length of the leaf; secondary nerves few, reticulations irregular, prominent in dry specimens; petiole .3 to .5 in. long, often twisted, channelled above, articulate at the base. *Flowers* sessile, in terminal or axillary or extra-axillary, trichotomous, minutely

pubescent panicles, 1·5 to 3 in. long; rachis angular, swollen at the nodes; bracts subulate, recurved, ·1 in. long; bracteoles triangular, minute. *Calyx-tube* very short; lobes 4, triangular, acuminate. *Corolla* yellowish- or greenish- white, fleshy; tube urceolate, ·05 to ·1 in. long; lobes oblong, incurved, ·05 in. long, induplicate-valvate in bud. *Stamens* 2, inserted on the tube of the corolla; filaments very short, broad; anthers ovate, rather large. *Ovary* ovoid; style 0; stigma 2-lobed; cells 2, ovules 2 in each cell, erect from a minute basal central placenta. *Berry* ovoid or globose, ·5 to ·7 in. in diam., rough, surmounted by the persistent stigma, blueish-black when ripe; cells 2. *Seeds* 2 to 4, erect on an enlarged placenta at the base of the central dissepiment; albumen fleshy, testa membranous. *Mus.* Bot. Lugd. Bat. I. 320, t. 51; A.DC. Prod. VIII. 290; Miq. Fl. Ind. Bat. II. 549; Clarke in Hook. f. Fl. Br. Ind. III. 618.

PENANG: *Curtis* 2849. PERAK: *Wray* 2139, 2834, 4179; *Scortechini* 532, 598*b*; *King's Collector* 3584, 4544, 7392, 8845. MALACCA: *Main-gay* (K.D.) 996/3—DISTRIB. Sumatra (*Forbes* 1585, in the Lam-pongs); Java.

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 18.

This part contains nine Natural Orders, viz., Nos. 79 *Hydrophyllaceæ* to 85 *Lentibulariaceæ* inclusive, as well as Nos. 87 *Bignoniaceæ* and 88 *Pedalineæ*. The whole part is the work of Lieut.-Col. D. Prain, I.M.S., F.R.S., Superintendent of the Royal Botanic Garden, Calcutta, with the exception of *Boragineæ*, which has been done by Sir George King, and *Hydrophyllaceæ* and *Bignoniaceæ*, which have been done by Mr. Gamble.

The nine Orders dealt with contain 53 genera and 150 species : of the species none are here described for the first time.

Natural Order No. 86 *Gesneraceæ* will follow later on with the three Orders, 75 *Apocynaceæ*, 76 *Asclepiadaceæ*, and 77 *Loganiaceæ*, the preparation of which is not yet quite complete.

### Order LXXIX. HYDROPHYLLACEÆ.

Annual or perennial herbaceous plants. *Leaves* radical or alternate, rarely opposite, entire or dentate, simple or pinnately or palmately lobed. *Flowers* usually unilaterally sub-sessile on the branches of a bifid or dichotomous scorpioid cyme, or else pedunculate in the axils or on the summits of the branches ; regular, hermaphrodite. *Calyx*

inferior, with 5 or occasionally many equal imbricate lobes. *Corolla* gamopetalous, funnel-shaped cup-shaped campanulate or rotate; lobes 5, rarely many, imbricate or sometimes twisted. *Stamens* as many as the corolla-lobes, alternate with them, usually fixed to the base of the tube, exsert or included; filaments filiform, sometimes dilated or appendiculate at base; anthers ovate, oblong or linear, dorsifixed; cells 2, parallel, dehiscent introrsely with longitudinal clefts. *Ovary* superior, sometimes unilocular, with 2 free or parietal placentas, sometimes more or less completely 2-celled with fleshy placentas adnate to the septum; styles either 1 filiform bifid or undivided, or 2 distinct from the base; stigmas terminal, small or capitate; ovules 2 to many in each cell. *Capsule* loculicidally, sometimes septicidally, bi-valved, the placentas if parietal attached to the valves, if central remaining free. *Seeds* usually oblong, globose or angular, 2 to many on each placenta; testa reticulate or wrinkled, rarely smooth; albumen fleshy, embryo small, erect; cotyledons plano-convex or semi-terete.—**DISTRIB.** About 150 species, chiefly American, very few in the Old World.

#### HYDROLEA, Linn.

Herbs or undershrubs. *Leaves* entire, alternate. *Flowers* blue, in short terminal cymes or racemes. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, sub-rotate, lobes imbricate. *Stamens* 5, attached to the corolla-tube; filaments filiform, sometimes dilated at base; anthers sagittate. *Ovary* completely 2-celled, with fleshy placentas adnate to the dissepiment; styles 2, rarely 3, distinct, filiform; stigmas capitate; ovules many in each cell, multi-seriate. *Capsule* globose or ovoid, septicidal, usually 2-, rarely 3- or 4-valved. *Seeds* minute, irregularly wrinkled.—**DISTRIB.** About 14 species, chiefly American, with one Chinese, one of tropical Africa, and one of India and Malaya.

*HYDROLEA ZEYLANICA*, Vahl Symb. II. 46 (1791). An annual herb; stems nearly glabrous below, glandular pubescent above, soft, somewhat succulent, often rooting, always straggling. *Leaves* membranous; lanceolate or oblong-lanceolate, attenuate above and below; .5 to 2 in. long, .2 to .5 in. broad; glabrous or slightly pubescent; petiole none or very short and winged by the decurrent blade. *Flowers* in racemes on short lateral leafy branches. *Calyx-lobes* acute, glandular-pubescent, 3-nerved, about .3 in. long. *Corolla-lobes* ovate, .2 in. long, many-nerved, blue. *Stamens* with sagittate, often twisted anthers, and filaments dilated at base. *Capsule* shorter than the calyx-lobes, ovoid, 2-lobed; placentas central, adherent at their backs to the dissepiment. *Seeds* very many,

oblong, obtuse, testa very faintly wrinkled. Lamk Ill. t. 184; Wall. Cat. 4398; W. & A. in Hook. Comp. Bot. Mag. II. 193, t. 26; Wight Ill. t. 167, and Ic. t. 601; Choisy in DC. Prod. X. 180; Dalz. & Gibs. Bomb. Fl. 170; Miq. Fl. Ind. Bat. II. 633; Clarke in Hook. f. Fl. Br. Ind. IV. 133; Trimen Fl. Ceyl. III. 191. Cooke Bomb. Fl. II. 197; Prain Beng. Plants 711. *H. javanica*, Blume Bijdr. 725. *Nama zeylanica*, Linn. Sp. Pl. 226; Roxb. Fl. Ind. II. 73. "Tsjeru Vallel," Rheede Hort. Mal. X. t. 28.

PERAK: Wray 2571, 3336; *Scortechini*; Ridley 2906; King's Collector 391, 2577.—DISTRIB. Throughout India, Ceylon, Burma, Siam, Java, Malaya, China, the Philippines; also in Australia, tropical Africa and America, in wet places and rice-fields.

### Order LXXX. BORAGINÆÆ.

Herbs, shrubs, or trees, often conspicuously hispid or scabrous. *Leaves* alternate, very rarely opposite, ex-stipulate, usually entire, rarely in verticils. *Flowers* usually in scorpioid dichotomous cymes, sometimes trichotomously paniculate, rarely solitary and axillary, bracteate or not, hermaphrodite. *Calyx* inferior, 5-lobed (rarely 6- to 8-lobed), the lobes imbricate, rarely valvate, usually persistent in fruit. *Corolla* gamopetalous, of various forms, often with scales in the throat; the limb 5-lobed (rarely 4- to 6-lobed), the lobes imbricate, rarely twisted. *Stamens* as many as the lobes and alternate with them, inserted on the tube; anthers ovate to linear, introrse; filaments slender, often dilated at the base. *Disk* under the ovary or obsolete. *Ovary* superior, sessile, cells 2 with 2 ovules in each, or 4 with 1 ovule in each; style terminal or from the depression between the lobes of the ovary, long or short; stigma entire and capitate or 2-lobed, the style rarely twice bifid; ovules sub-erect from the basal angle of the cell. *Fruit* drupaceous with a hard 2- to 4-celled endocarp or dividing into 2 or 4 nutlets with thin or fleshy walls. *Seeds* erect or oblique, with membranous testa and fleshy albumen or ex-albuminous; embryo curved or straight, radicle superior.—DISTRIB. Universal. Species about 1,500.

Styles twice partite; drupe 4-1-seeded; trees or shrubs; calyx enlarging in fruit .. .. 1. *Cordia*.  
 Styles simple or only bi-partite; rarely (*Coldenia*) 2 or more and distinct; drupe including two 2-seeded or four 1-seeded pyrenes; calyx only slightly or not at all enlarged in fruit:—

Styles depressed-conical at the apex or with a horizontal ring below or at the stigmas:—

- Styles short, shortly 2-lobed; pyrenes two 2-seeded; herbs or shrubs .. .. 2. *TOURNEFORTIA*.  
 Styles elongated, dilated at the apex; pyrenes four 1-seeded, much resembling nutlets; herbs .. .. 3. *HELIOTROPIMUM*.  
 Styles elongated, not dilated or annular at the apex, more or less bi-partite:—  
 Styles 2-fid at the apex; pyrenes two 2-seeded, or four 1-seeded; trees or shrubs .. .. 4. *EHRETIA*.  
 Styles more or less separate, distinct at base and apex, united but easily separable in the middle; pyrenes four 1-seeded, much resembling nutlets; prostrate herbs .. 5. *COLDENIA*.

1. *CORDIA*, Linn.

Trees or shrubs. *Leaves* alternate, rarely sub-opposite, petiolate. *Flowers* in dichotomous cymes with scorpioid branches, or corymbose or in clusters, ebracteate, polygamous, the ♀ fewer than the ♂. *Calyx* tubular or campanulate, usually with short and often irregular teeth, accrescent in fruit. *Corolla* funnel- or salver-shaped or campanulate; the lobes of the limb 4 to 8, spreading or recurved, white or orange. *Stamens* as many as the lobes; anthers sagittate or hastate, shortly exserted; filaments often hairy near the base. *Ovary* 4-celled, glabrous; style terminal, long, bi-partite, the branches again bifid, linear or sub-spathulate, cells of ovary 1-ovuled. *Fruit* ovoid or ellipsoid, surrounded by the enlarged calyx; the putamen bony, with 1 to 4 cells, but one only with a fertile seed. *Seed* exalbuminous, the cotyledons large and fleshy or thin but always plicate.—*DISTRIB.* About 280 species, all tropical.

- Flowers about 1·5 in. long .. .. 1. *C. subcordata*.  
 Flowers less than 1·5 in. long:—  
 Leaves broadly ovate, sub-acute or obtuse, the base often cordate 2. *C. Myxa*.  
 Leaves ovate-lanceolate, acuminate, the base cuneate .. 3. *C. Griffithii*.

1. *CORDIA SUBCORDATA*, Lamk Ill. 1899 (1792). A small tree; young branches as thick as a goose-quill, glabrous, pale brown when dry. *Leaves* membranous; broadly ovate or ovate-rotund, the apex acute, the base broadly rounded or sub-cordate; both surfaces brown when dry, the lower paler, harshly and minutely reticulate; main-nerves 4 or 5 pairs, faint on both surfaces when dry; length 3·5 to 6·5 in., breadth 2·5 to 4 in.; petiole 1·25 to 2 in. *Corymbs* lateral, few-flowered, shorter than the leaves, glaberrulous; pedicels 25 in. long. *Calyx* cylindric, slightly widening towards the mouth, 4 in. long and nearly 2 in. wide at the middle, glabrous; the limb with 3 broad triangular teeth. *Corolla* about 1·3 in. long, orange or reddish, funnel-shaped; lobes about 6, broad, spreading, as long as the tube. *Stamens* 6.

*Stigma* with linear-spathulate branches. *Fruit* very bony, pyramidal, its apex acute, with 4 bold angles, the spaces between the angles often with large tubercles, 1 in. long and as much in breadth from angle to angle, usually with 1 or more seeds; entirely enveloped in the much-inflated glabrous accrescent apiculate calyx. Wall. Cat. 9063; DC. Prod. IX. 477; Seem. Fl. Viti, t. 34; Benth. Fl. Austral. IV. 385; Kurz For. Fl. Burm. II. 209; Clarke in Hook. fil. Fl. Br. Ind. IV. 140; Miq. Fl. Ind. Bat. II. 914. *C. orientalis*, R. Br. Prod. 498. *C. campanulata*, Roxb. Fl. Ind., ed. Carey & Wall. II. 336. *C. Rumphii*, Blume Bijdr. 843. *C. hexandra*, Roem. & Schult. Syst. IV. 799. Rumph. Herb. Amb. II. t. 75.

PERAK: *Scortechini* 1084. DINDINGS: *Curtis* 3447. KEDAH: *Ridley* 5526. PAHANG: *Ridley* 2158.—DISTRIB. British India, Malay Archipelago, Australia, Sandwich Islands. Widely cultivated in other places.

2. *Cordia MYXA*, Linn. Sp. Pl. 190 (1753). A tree, 40 to 50 feet high; young branches thinner than a goose-quill, glabrous. *Leaves* thinly coriaceous; broadly ovate, apex sub-acute or obtuse, the base slightly cordate; upper surface when dry dark brown, glabrous, faintly reticulate; the lower paler brown, distinctly and minutely reticulate, the transverse veins very prominent, glabrous except for some pubescence on the midrib and 5 or 6 pairs of curved ascending main-nerves; length 3 to 3·75 in., breadth 2 to 2·75 in.; petioles ·75 to 1·25 in. *Cymes* trichotomous, shorter than the leaves, terminal. *Male and female* flowers often in the same tree, mostly 5-merous. *Calyx* campanulate, more than ·25 in. long, glabrous, smooth outside, silky inside. *Corolla* with its tube included in the calyx, the lobes projecting and ·15 in. long, reflexed; style in the ♀ flowers short, 4-cleft, absent in the ♂. *Fruit* ellipsoid, with acute apex and rounded base, compressed, with 3 or 4 angles (one or more of them indistinct), ·75 in. long and ·4 in. broad, 2- or more-seeded; the persistent accrescent calyx leathery with strong vertical reticulations, widely campanulate, its mouth with shallow irregular crenations, length ·25 in., width ·4 to ·5 in. DC. Prod. IX. 479; Delile Fl. Ægypt. t. 19, fig. 1; Roxb. Fl. Ind., ed. Carey & Wall., II. 232; Wall. Cat. 889; Wight Ill. t. 169; Benth. Fl. Austral. IV. 386; Bedd. Fl. Sylv. t. 245, fig. A; Brandis For. Fl. 336 (*in part*); Kurz For. Fl. Burm. II. 208; Boiss. Fl. Or. IV. 124; Miq. Fl. Ind. Bat. II. 915; Clarke in Hook. fil. Fl. Br. Ind. IV. 136; Trimen Fl. Ceyl. III. 193; Cooke Fl. Bomb. II. 199; Prain Beng. Plants 714. *C. Myxa*, var. *b. minor only*, Thw. Enum. Pl. Zeyl. 214. *C. indica*, Lamk Dict. VII. 49; DC. Prod. IX. 500. *C. officinalis* and *C. africana*, Lamk Ill. II. 420, and t. 96, fig. 3. *C. Sesbestena*, Forsk. Fl. Aeg.-Arab. LXIII. *C. paniculata*, Roth Nov. Spec. 124; DC. Prod.

IX. 482. *Sebestena officinalis*, Gaertn. Fruct. I. 364, t. 76. *Ehretia glabra*, Roth Nov. Spec. 127; DC. Prod. IX. 510. *Beurreria glabra*, G. Don Gen. Syst. 390.

MALACCA and SINGAPORE : probably introduced.—DISTRIB. Tropics of the Old World.

3. *CORDIA GRIFFITHII*, Clarke in Hook. fil. Fl. Br. Ind. IV. 139 (1883). A small tree; young branches about as thick as a crow-quill, puberulous, pale and angled when dry. *Leaves* thinly coriaceous; ovate-lanceolate, acute or acuminate, the base slightly cuneate; both surfaces brown when dry (the lower the paler), minutely reticulate, glabrous; main-nerves 3 or 4 pairs, curved, ascending; length 1·5 to 3·5 in., breadth 1 to 1·75 in.; petioles ·65 to 1·25 in. *Cymes* slender, 2·5 to 4 in. long (including their peduncles), dichotomous, lax, few-flowered, puberulous. *Flowers* 4 in. long, almost sessile. *Calyx* ·25 in. long, funnel-shaped; the mouth wide, oblique, and with 5 irregular short teeth. *Corolla* funnel-shaped, much longer than the calyx; the limb longer than the tube, deeply divided into 5 narrowly elliptic reflexed lobes. *Stamens* 5, attached to the throat of the tube; anthers oblong, exserted; filaments unequal in length, flattened below. *Ovary* obovoid, smooth, 4-celled, ovules solitary in each cell; style thin and cylindric above, swollen in its lower half, exserted.

MALACCA : *Griffith* (K.D.) 5997; *Maingay* (K.D.) 1162; *Ridley* 4561. SELANGOR : *Ridley* 7373. KEDAH : *King's Collector* 1742.

## 2. *TOURNEFORTIA*, Linn.

Trees or shrubs, sometimes almost herbs, and often sub-scandent. *Leaves* alternate, entire. *Cymes* scorpioid, dichotomous, usually terminal, rarely lateral or extra-axillary. *Flowers* small, numerous, crowded, sessile or on short pedicels, ebracteate. *Calyx* deeply 4- or 5-partite, the segments ovate or lanceolate. *Corolla* white or greenish; the tube cylindric, naked in the throat; the lobes of the limb 5 or 4, small, spreading. *Stamens* 5 or 4, included in the tube; anthers oblong-ovate or lanceolate, apiculate or not; filaments short. *Ovary* 4-celled; style terminal, short, 2-lobed (in the Indo-Malayan species); ovules 1 in each cell, pendulous from the upper inner part of the cell. *Drupe* small, ovoid, slightly fleshy or leathery, indistinctly separating into two 2-seeded or into four 1-seeded pyrenes. *Seeds* straight or curved, pendulous, albuminous; embryo straight or curved.—DISTRIB. About 130 species, in the tropics of both hemispheres.

*TOURNEFORTIA WALLICHII*, DC. Prod. IX. 527 (1845). A climber, 10 to 30 feet long; young branches terete, twice as thick as a crow's-quill, minutely rusty-puberulous, becoming glabrous. *Leaves* thickly mem-

branous; ovate, the apex acute or shortly acuminate, the base rounded, slightly oblique; both surfaces when dry brown, the upper quite glabrous, the lower paler, reticulate, sometimes with a few small hairs on the nerves; main-nerves 4 or 5 pairs, curved, ascending, depressed like the midrib on the upper surface, prominent on the lower; length 2 to 3·5 in., breadth ·75 to 1·75 in.; petioles ·3 to ·4 in. *Cymes* terminal and lateral (extra-axillary), on long peduncles, dichotomously branched, sub-glabrous. *Flowers* ·3 to ·4 in. long, sessile, forming crowded one-sided pseudo-spikes (scorpioid cymes) on the terminal inch or two of the branches of the cymes. *Calyx* about ·05 in. long, only about a sixth or a seventh as long as the corolla, cleft nearly to the base into 4 broadly triangular acute spreading segments. *Corolla-tube* 4-angled; the limb short, with 4 ovate teeth, glabrous. *Anthers* 4, oblong, sessile or nearly so, near the throat. *Fruit* broadly ovoid, ·15 to ·2 in. long, with 4 vertical grooves (2 of them deep) on the sides, and a depression on the apex. Clarke in Hook. fil. Fl. Br. Ind. IV. 147. *T. tetrandra*, Wall. Cat. 911 (not of Blume). *Tetrandra Wallichii*, Miq. Fl. Ind. Bat. II. 928.

SINGAPORE: *Maingay* (K.D.) 1165, 8041; *King's Collector* 302. PERAK: *Wray* 3536; *Ridley* 2431; *King's Collector* 3335, 5158 *Scortechini* 1494.—DISTRIB. Java, Sumatra.

### 3. HELIOTROPIMUM, Linn.

Annual or perennial herbs, very hairy or scabrous. *Leaves* alternate. *Flowers* small, white, or pale purple, sometimes in terminal dichotomous cymes with scorpioid branches and small or no bracts, sometimes axillary in the axils of large bracts. *Calyx* divided into 5 linear or lanceolate segments. *Corolla* with a cylindric tube and limb of various shapes, the lobes of the latter always imbricate or induplicate in bud, spreading in flower. *Stamens* 5, included, inserted on the tube by short filaments; anthers ovate-oblong or lanceolate. *Ovary* completely or imperfectly 4-celled, 4-ovulate; style short or long, terminal, with a depressed conical or flat disk on its apex; stigma above the disk, none or short or elongate, entire or rarely bifid. *Fruit* dry, 2- to 4-grooved or -lobed, and consisting of 4 nutlets free from the beginning or finally becoming so. *Seeds* straight or curved; albumen none, small or large; cotyledons plano-convex.—DISTRIB. Species about 225, widely distributed in both hemispheres.

Leaves ovate-lanceolate, 1·5 to 2·5 in. long ..	..	..	1. <i>H. indicum</i> .
Leaves linear, ·5 to 1 in. long ..	..	..	2. <i>H. strigosum</i> .

1. HELIOTROPIMUM INDICUM, Linn. Sp. Pl. 130 (1753). Herbaceous,

but woody at the base, a foot or two in height, with few branches; the branches, lower parts of the inflorescence, and the petioles with white stiff hairs. *Leaves* membranous, greenish-brown when dry; ovate or ovate-lanceolate, slightly inequilateral, the apex usually acute, the base rounded, irregularly cordate, often unequally so; both surfaces with some scattered long white hairs; the lower surface pale and faintly reticulate when dry; main-nerves 6 to 8 pairs, rather straight, ascending, slightly prominent on the lower surface; length 1·5 to 2·5 in., breadth ·75 to 2 in.; petioles ·4 to 1·5 in. *Cymes* scorpioid, terminal and lateral (extra-axillary), about 2 in. long (lengthening with age to 5 or 6 in.), on peduncles about 1 in. long; the rachises hispid, compressed when dry. *Flowers* about ·15 in. long, sessile, numerous. *Calyx* about ·05 in. long, deeply divided into 5 narrowly lanceolate sub-erect hispid segments. *Corolla* tubular, slightly dilated at the base; the limb with 5 broad blunt reflexed lobes; anthers 5, included, inserted about the middle of the tube. *Fruit* ·1 in. long, conical, with an apical beak and with 4 bold vertical ridges and 4 faint ones, glabrous naturally separating into 2 halves, each half consisting of 2 cohering pyriform pyrenes with long beaks and a single large sub-quadrate white seed. Roxb. Fl. Ind. I. 454; Bot. Mag. t. 1837; Clarke in Hook. fil. Fl. Br. Ind. IV. 152; Trimen Fl. Ceyl. III. 200; Cooke Fl. Bomb. II. 207; Prain Beng. Plants 716. *H. anisophyllum*, Beauv. Fl. Ow. et Ben. II. 62, t. 96. *Tiaridium indicum*, Lehm. Asperifol. 14; Wall. Cat. 913; Wight Ill. t. 171. *T. anisophyllum*, G. Don Gen. Syst. IV. 364. *Heliophyllum indicum*, DC. Prod. IX. 556; Fresen. in Mart. Fl. Brasil, fasc. 22, 48, t. 10, fig. 4; Miq. Fl. Ind. Bat. II. 925. *H. velutinum*, DC. l.c. 557.

SINGAPORE: *King's Collector* 318; *Hullett* 21. PAHANG: *Ridley* 1547. PENANG: *Deschamps*. PERAK: *Scortechini* 163.—DISTRIB. India, Malaya, E. Asia, tropical Africa and America.

2. *HELIOTROPIUM STRIGOSUM*, Willd. Sp. Pl. I. 743 (1797). Herbaceous, woody at the base, erect, a foot high, the branches few, slender, long, not spreading, very strigose, like all the rest of the plant. *Leaves* linear, ·5 to 1 in. long, very narrow, becoming smaller upwards. *Flowers* under ·1 in. long; their pedicels longer, sub-opposite to a linear bract or often extra-axillary. *Sepals* ovate-acute, enlarging in fruit. *Corolla* salver-shaped; stigma narrowly conical. *Fruit* depressed, 4-lobed, under ·1 in. broad, glabrous and shining, sometimes with a few small hairs. DC. Prod. IX. 546; Clarke in Hook. fil. Fl. Br. Ind. IV. 151; Boiss. Fl. Orient. IV. 143; Prain Beng. Plants 716. *H. brevifolium*, Wall. Cat. 914; Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 2; DC. l.c. 546. *H. compactum*, Don Prod. 101.



In all the provinces, by waysides, not common.—DISTRIB. From W. Asia through India to Australia.

4. EHRETIA, Linn.

Glabrous or scabrous shrubs or trees. *Leaves* alternate, entire or dentate. *Flowers* small, usually white, in axillary or terminal corymbs or panicles, rarely on 1-flowered axillary peduncles. *Calyx* small, 5-partite. *Corolla* with short cylindric tube; the limb with 5 obtuse imbricate spreading lobes. *Stamens* 5, inserted on the tube, exserted, rarely included, ovate or oblong. *Ovary* 2-celled, the cells bi-ovulate; sometimes imperfectly 4-celled and the cells with solitary ovules; style terminal, cylindric, bifid or bi-partite; stigmas small, capitate or clavate. *Drupe* small, usually globose, 4-seeded or (by suppression) 1-3-seeded; usually dividing into 2 bilocular or into 4 unilocular, often compressed pyrenes. *Seeds* straight, with little albumen and thin testa.—DISTRIB. About 55 species, all tropical, chiefly in the Old World.

Leaves ovate to elliptic-oblong, shortly acuminate, with about 5 pairs of main-nerves	..	..	..	..	1. <i>E. laevis</i> .
Leaves obovate or obovate-elliptic, obtuse retuse or sub-acute, with 7 or 8 pairs of main-nerves	..	..	..	..	2. <i>E. parallela</i> .

1. EHRETIA LAEVIS, Roxb. Cor. Pl. I. 42, t. 55; var. *timorensis*, Clarke in Hook. fil. Fl. Br. Ind. IV. 142 (1883). A small tree; young branches rusty-puberulous, becoming ultimately glabrous, dark coloured when dry. *Leaves* thinly coriaceous; ovate to elliptic-oblong, shortly acuminate, the base slightly cuneate or sometimes rounded; both surfaces glabrous, brown when dry, the lower paler and reticulate; main-nerves about 5 pairs, rather straight, ascending slightly, thin but prominent on the lower surface like the midrib; length 2·5 to 5 in., breadth 1·25 to 2·25 in.; petioles about ¼ in. *Cymes* axillary and terminal, shorter than the leaves, corymbose, puberulous; the ultimate branches scorpioid. *Flowers* small, numerous, sessile. *Calyx* less than ½ in. long, its mouth with 5 oblong lobes. *Corolla-tube* ½ in. long; the lobes 5, shorter and spreading. *Anthers* exserted. *Fruit* when 4-seeded about 2 in. in diam., smaller when 2-seeded, depressed-globose, ribbed; pyrenes 4 or 2, sometimes only 1, each with a single seed; the persistent calyx much shorter than the fruit, its lobes acuminate. *E. timorensis*, Dene. in Nouv. Ann. Mus. d'Hist. Nat. III. 395; DC. Prod. IX. 505. *E. philippinensis*, DC. l.c. 504. *E. laevis*, Benth. Fl. Austral. IV. 389.

MALACCA: *Maingay* (K.D.) 1164; *Ridley* 3302. PERAK: *Scortechini*

167, 898; *King's Collector* 7436, 8344.—DISTRIB. Burma, *Griffith* (K.D.) 6002, Malay Archipelago, Australia.

2. *EHRETIA PARALLELA*, Clarke in Hook. fil. Fl. Br. Ind. IV. 143 (1883). A shrub, all parts except the inflorescence glabrous; young branches thinner than a goose-quill, pale when dry. *Leaves* membranous; obovate or obovate-elliptic, obtuse, from retuse to sub-acute, cuneate at the base; both surfaces dark brown when dry; main-nerves 7 or 8 pairs, scarcely curved, ascending, parallel, very bold and distinct on the lower surface like the midrib (when dry), faint on the upper; length 1·5 to 1·75 in., breadth ·75 to 1 in.; petiole ·25 in. Inflorescence, flowers, and fruit as in *E. laevis*, Roxb., var. *timorensis*, but smaller.

PENANG: *Curtis* 1572.—DISTRIB. Burma, *Griffith* (K.D.) 6004.

### 5. *COLDENIA*, Linn.

Much-branched, diffuse or prostrate scabrous herbs. *Leaves* alternate, crisped. *Flowers* small, axillary, sessile or sub-sessile; the upper sometimes in a short one-sided bracteate cyme. *Calyx* 4–5-partite. *Corolla* with short funnel-shaped tube and 4 or 5 spreading segments imbricate in bud. *Stamens* 4 or 5, inserted on the tube; anthers ovate. *Ovary* broadly ovoid, 2-celled, with 2 ovules in each cell, or imperfectly 4-celled with 1 in each; styles 2, distinct at the base but united upwards (although easily separable); stigmas 2, capitate. *Fruit* almost dry, composed of 4 sub-connate 1-seeded pyrenes; seeds with thin testa and little if any albumen; the cotyledons plane.—DISTRIB. Species 12, 10 of which are American, 1 African, and the undernoted which is cosmopolitan.

*COLDENIA PROCUMBENS*, Linn. Sp. Pl. 125 (1753). A scabrous-hairy prostrate herb. *Leaves* elliptic-obovate, coarsely and deeply serrate, almost pinnatifid. *Fruit*, prior to disintegration into its component pyrenes, pyramidal. Gaertn. Fruct. I. 329, t. 68; Lamk Ill. t. 69; Roxb. Fl. Ind. I. 448; Wall. Cat. 942; DC. Prod. IX. 558; Miq. Fl. Ind. Bat. II. 933; Clarke in Hook. fil. Fl. Br. Ind. IV. 144; Trimen Fl. Ceyl. III. 197; Cooke Bomb. Fl. II. 205; Prain Beng. Plants 718. *Lobophyllum tetrandrum*, F. Muell. in Hook. Kew Journ. Bot. IX. 21. *Waltheria microphylla*, Miq. in Pl. Hohenack. n. 87b (*not of Cav.*).

By waysides, not common.—DISTRIB. Everywhere in the tropics.

## Order LXXXI. CONVULVULACEÆ.

[By D. PRAIN.]

Herbs or shrubs, usually twining, occasionally erect; very rarely trees; sometimes parasitic. *Leaves* alternate or in parasitic species.

obsolete; stipules 0. *Flowers* in cymes, rarely solitary, regular, hermaphrodite; bracts at cyme-bases or under solitary flowers opposite; bracteoles at base of pedicels small, scale-like. *Sepals* 5, imbricate, occasionally slightly connate below, often persistent, sometimes accrescent. *Corolla* campanulate or infundibuliform, rarely sub-rotate; limb with 5 short or long lobes often plicate in bud, after flowering either involute or reverting to the original æstivation. *Stamens* 5, adnate to corolla-tube; anthers oblong, opening by longitudinal introrse or lateral slits. *Carpels* usually 2, very rarely 3 or more; connate throughout in a superior ovary with its base often encircled by an annular or lobed disk, and its cells as many or, by development of accessory partitions, twice as many as the component carpels, rarely, from absorption of dissepiments, fewer than carpels; ovules 2 in each carpel, sessile erect anatropous; style solitary or rarely styles 2; stigma capitate or 2-lobed or 2-fid. *Fruit* an indehiscent often dry berry, or a 2-4-valved or circumscissile or irregularly opening capsule. *Seeds* 4 to 2, rarely solitary, erect; albumen scanty or 0; cotyledons generally plicate, rarely flat.—DISTRIB. Species about 1,000, in all regions, but more abundant in sub-tropical and tropical countries.

Corolla-tube usually uniformly enlarged from base to apex, the 5 bands or lobes rarely, except in *Erycibe*, clearly defined from the intervening spaces; pollen not spinulose:—

Yellow parasitic twining leafless herbs .. .. 1. CUSCUTA.

Green non-parasitic leafy herbs, shrubs or trees:—

Fruit indehiscent, woody or fleshy, rather large; style short or 0; stigma 5-10-rayed; corolla-lobes 2-fid, the lobules induplicate, contorted; woody, climbing shrubs or erect trees .. 2. ERYCIBE.  
Fruit dehiscent, or if indehiscent small, with thin fragile walls:—

Flowers in racemes or panicles —

Bracts not enlarged in fruit; outer 3 or all of the sepals enlarged in fruit; style entire or shortly 2-lobed; capsule indehiscent or rarely 2-valved .. .. 3. PORANA.

Bracts in fruit much enlarged, scarious, adnate to calyx; sepals not enlarged; capsule 4-valved, 1-seeded .. 4. NEUROPELTIS.

Flowers in cymes or solitary; capsule valvate or opercular, rarely dehiscing irregularly:—

Styles 2, free or partially united below; sepals not or slightly enlarging in fruit:—

Capsule 4-valved, 2-1-locular, 4-2-seeded; styles quite free, each 2-branched; cymes few-flowered .. 5. EVOLVULUS.

Capsule irregularly dehiscent, splitting into numerous vertical segments; styles usually partially united below, stigmas capitate; cymes sub-capitate .. 6. BONAMIA.

Style entire, stigmas usually 2:—

Ovary 1-locular; capsule 4-valved, 4-seeded; stigmas shortly oblong; calyx-lobes not enlarged in fruit:—

- Bract enveloping the calyx ; pollen spherical .. 7. *CALYSTEGIA*.  
 Bract not enveloping the calyx ; pollen polyhedral .. 8. *HEWITTIA*.  
 Ovary 2-locular, sometimes 4-locular :—  
 Outer 3 sepals much larger than the 2 inner, and  
 decurrent on the peduncle ; stigmas capitate .. 9. *ANISEIA*.  
 Outer 3 sepals not larger than the 2 inner, and not  
 decurrent on the peduncle :—  
 Stigmas elliptic ; capsule 8-valved, rarely 4-valved 10. *JACQUEMONTIA*.  
 Stigmas globose :—  
 Capsule 4-valved ; fruiting sepals not enlarged ;  
 bands of corolla usually with 5 purple lines ;  
 stems not winged .. .. 11. *MERREMIA*.  
 Capsule with circumscissile dehiscence ; fruiting  
 sepals considerably enlarged ; bands of corolla  
 without lines ; stems winged .. .. 12. *OPERCULINA*.  
 Corolla-tube not uniformly enlarged from base to apex, the  
 5 bands on the lobes clearly defined by 2 prominent lines ; pollen  
 spinulose :—  
 Fruit dehiscent, or if indehiscent then with thin fragile walls :—  
 Stamens arising from the backs of 5 scales attached to  
 the corolla-tube ; flowers small urceolate, fasciculate ; fruit  
 4-valved .. .. 13. *LEPISTEMON*.  
 Stamens arising directly from the corolla-tube :—  
 Corolla more or less campanulate ; calyx-lobes never  
 aristate, inflorescence never scorpioid ; stamens not ex-  
 serted .. .. 14. *IPOMOEA*.  
 Corolla more or less hypocrateriform ; calyx-lobes aristate,  
 or if obtuse the inflorescence scorpioid ; stamens exserted :—  
 Flowers rather small, pink or red, slightly irregular .. 15. *QUAMOCUIT*.  
 Flowers large white, regular .. .. 16. *CALONYCTION*.  
 Fruit indehiscent, coriaceous or fleshy :—  
 Ovary 4-celled .. .. 17. *ARGYREIA*.  
 Ovary 2-celled .. .. 18. *LETTSOMIA*.

1. *CUSCUTA*, Linn.

Leafless twining yellow-reddish parasitic herbs. *Flowers* small, white or rose-coloured, fascicled, sessile or shortly pedicelled ; bracts small or 0. *Sepals* 5 or 4, sub-equal ; free or shortly connate at the base. *Corolla* ovoid or campanulate, usually with a ring of fimbriate or lobed scales near the base or below the stamens ; lobes short, imbricate. *Stamens* 5 or 4, adnate near throat of corolla ; filaments short, linear ; anthers oblong, partially exserted. *Ovary* more or less completely 2-celled ; ovules 4 ; styles 2 or 1 ; stigmas 2. *Fruit* a globose or ovoid, dry or succulent, circumscissile or irregularly bursting 4–2-seeded capsule. *Seeds* glabrous ; albumen fleshy ; embryo slender, spiral ; cotyledons minute or obsolete.—*DISTRIB.* Species about 80, in temperate and tropical regions.

*CUSCUTA* *HYGROPHILÆ*, H. H. W. Pears. in Hook. Ic. Plant. t. 2704.

A small slender parasitic twiner. *Flowers* in dense umbellate cymes, .25 in. wide. *Sepals* ovate obtuse, connate below, .1 in. long. *Corolla* .15 in. wide, campanulate; lobes ovate obtuse. *Stamens* 5, shortly exserted. *Scales* near base of corolla-tube shortly fimbriate. *Ovary* obtuse, more or less perfectly 2-celled; ovules 4; styles 2; stigmas capitate. *Fruit* an oblate capsule, .15 in. wide.

JOHORE: near the town, parasitic on *Hygrophila quadrivalvis*, Ridley 9161!

Closely related to *C. chinensis*, from which it differs in having the sepals without keels, and of which the writer believes it to be a form.

## 2. ERYCIBE, Roxb.

Shrubs, scandent or diffuse, less often erect; rarely trees. *Leaves* alternate, elliptic, entire, coriaceous. *Flowers* rather small; cymes in axillary or terminal panicles or racemes; bracts lanceolate, small. *Sepals* 5, small, sub-equal, orbicular, coriaceous, adpressed to base of fruit. *Corolla* rather small, white or yellowish, sub-rotate; tube hirsute externally; limb 5-lobed, the lobes obcordate, induplicate-contorted in bud, with a thicker triangular centre externally hirsute, and sub-membranous semicordate margins glabrous on both sides. *Stamens* 5, sub-included, adnate to throat of corolla; filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled; ovules 4; stigma large, sessile, sub-globose or conic, 5- or 10-ridged. *Fruit* a fleshy, leathery or woody berry, ovoid or ellipsoid. *Seed* solitary, glabrous; albumen scanty, intruded between folds of fleshy cotyledons.—DISTRIB. Species about 30; throughout S.E. Asia.

Leaves more or less pubescent beneath:—

Pubescence on under surfaces of leaves persistent:—

Branches angular; bark fissured; pubescence on under side of leaves black, closely adpressed; leaves with acuminate tips, the lateral nerves in 5 pairs, obliquely ascending, hardly visible above . . . . . 1. *E. strigosa*.

Branches cylindric; bark not fissured: pubescence on under surface of leaves not adpressed, brown or tawny; leaves obtuse, the lateral nerves in 12 to 15 pairs, spreading not very oblique; fruit velvety . . . . . 2. *E. magnifica*.

Pubescence on under surface of leaves usually disappearing, except from the midrib, as the leaves become old; branches with fissured bark:—

Flowers in pyramidal terminal panicles, the panicle branches subtended by foliaceous bracts . . . . . 3. *E. expansa*.

Flowers in axillary cymes, or if passing into a terminal panicle the panicle branches not subtended by foliaceous bracts:—

- Flowers often passing into a terminal panicle; corolla greenish; fruit ellipsoid, black, .6 in. long, .35 in. wide .. 4. *E. Princei*.  
 Flowers all axillary; corolla white; fruit ellipsoid, purple, with a faint apical areola, .75 in. long, .5 in. wide .. 5. *E. malaccensis*.  
 Leaves quite glabrous on both surfaces:—  
 Flowers in both terminal and axillary panicles; leaves with lateral nerves distinct, but secondary venation indistinct .. 6. *E. angulata*.  
 Flowers always axillary:—  
 Leaves small, never exceeding 1.75 in. long, sub-bifarious; flowers solitary, axillary. . . . . 7. *E. leucoryloides*.  
 Leaves medium to large, very rarely, and never all, less than 2 in. long, arranged spirally; flowers never solitary:—  
 Lateral nerves of leaves distinct and secondary reticulate venation distinct on both surfaces, or at least beneath:—  
 Lateral nerves of leaves 7 to 9 pairs .. 8. *E. festiva*.  
 Lateral nerves of leaves 6 or fewer pairs:—  
 Fruit quite glabrous .. 9. *E. sapotacea*.  
 Fruit finely velvety .. 10. *E. Stapfiana*.  
 Lateral nerves of leaves indistinct, secondary venation not visible:—  
 Corolla rufous-pubescent internally as well as externally .. 11. *E. præcipua*.  
 Corolla glabrous internally:—  
 Flowers densely glomerate in leaf axils; leaves pale waxy greenish-yellow beneath .. 12. *E. glomerata*.  
 Flowers in short but open axillary cymes:—  
 Leaves thickly coriaceous; fruit verrucose but not scurfy externally .. 13. *E. aenea*.  
 Leaves sub-coriaceous; fruit scurfy but not verrucose externally .. 14. *E. Griffithii*.

1. *ERYCIBE STRIGOSA*, Prain Journ. As. Soc. Beng. LXV. 2. 536.  
 A climber 40 to 60 feet long, with stems 1 to 2 in. in diam.; branches slightly angled with fissured bark, and except along the fissures densely clothed with black adpressed tomentum; branchlets angular with black adpressed tomentum. *Leaves* elliptic or ovate-lanceolate, base cuneate, apex rather long acuminate, with tip obtuse; 3 to 4 in. long, 1.5 to 1.75 in. wide; thinly coriaceous; dark green, quite glabrous above, brownish-black and densely covered with black adpressed tomentum beneath; lateral nerves 5 pairs, oblique, distinct beneath not visible above, secondary venation indistinct beneath not visible above; petiole .75 to 1 in. long, with close adpressed black tomentum. *Flowers* in few-flowered cymes, .25 in. across, disposed in narrow axillary panicles 3 to 6 in. long, .5 in. wide; main-rachis angular, densely rusty-pubescent, the peduncles of individual cymes .25 in. long or less, densely rusty-pubescent, as are the linear deciduous bracteoles .15 in. long, and the very short pedicels. *Sepals* orbicular, rusty-pubescent. *Corolla* white, .3 in. across (but not quite fully opened), the lobes spreading, glabrous

within; interlobular spaces brown tomentose externally; lobules ovate, their margins sub-entire. Hallier f. Bull. Herb. Boiss. V. 737.

PERAK: Thaipeng, 500 to 800 feet elevation; *King's Collector* 8461!

2. *ERYCIBE MAGNIFICA*, Prain Journ. As. Soc. Beng. LXXIII. 2. 18. A strong creeper 80 to 100 feet long, stem 2 to 3 in. in diam.; old branches .75 in. in diam. still densely tomentose, quite cylindric, with large pith; branchlets .3 in. in diam., densely velvety with a tawny to rusty matted tomentum. *Leaves* elliptic or elliptic-obovate, with a narrowly truncate or rounded base, and an obtuse or sometimes retuse apex, the margin strongly revolute; 8 to 10 in. long, 3.5 to 4 in. wide; coriaceous; upper surface quite glabrous, dark green and shining with sometimes a silvery, sometimes a rich coppery sheen; under surface velvety, pale brownish-green, the tomentum longer, looser, and sometimes whitish on the main-nerves; lateral nerves rather straight, spreading, 12 to 15 pairs, rather distinctly looped along the margin, prominent beneath, deeply impressed above, as is the secondary reticulate venation; petiole .35 in. long, densely rusty-velvety. *Flowers* in short axillary racemes, sometimes clustered, of close-set 2-3-flowered individual cymules; the racemes 1 to 2 in. long; peduncles, short pedicels and small ovate bracts and bracteoles densely rusty-velvety. *Sepals* orbicular, densely velvety outside, quite glabrous within, coriaceous, in fruit .2 in. across. *Corolla* .5 in. across; lobes slightly spreading, glabrous within, and waxy white or yellow, narrow and deeply divided; interlobular spaces densely dark brown, almost black velvety-pubescent externally; lobules very small oblong. *Fruit* ellipsoid, 1.25 in. long, 1 in. in diam., densely softly velvety, of a rich brown colour.

PERAK: *King's Collector* 3454! 3879! 6721!

In the first of his three gatherings Kunstler has noted this as a tree 50 to 70 feet high, but in the two subsequent ones as a large creeper, which is, from the appearance of the specimens, undoubtedly the case with the first gathering also.

3. *ERYCIBE EXPANSA*, Wall. Cat. 1331. A large climber, branches angled, with fissured bark, glabrous; branchlets angular, densely rusty-tomentose. *Leaves* elliptic or slightly obovate, apex abruptly shortly acuminate to a sharp tip, base rounded or sub-cordate; 2 to 2.5 in. long, 1 to 1.5 in. wide; chartaceous; dark green, quite glabrous above, paler and rusty-pubescent, especially on the nerves, beneath, the pubescence ultimately disappearing except from the nerves in old leaves; lateral nerves 2 to 3 pairs, very oblique, ascending; secondary reticulate venation fairly visible above only; petioles .15 in. long, densely rusty-pubescent. *Flowers* in rather condensed 5-9-flowered cymes disposed in pyra-

midal terminal panicles 3 to 15 in. long, 1·5 to 6 in. wide, the main rachis and branches densely rusty-tomentose, the panicle branches ·75 to 2·5 in. long, subtended by large foliaceous bracts ·4 to 1 in. long, exactly like the foliage leaves but smaller; peduncles of individual cymes rusty-tomentose, ·25 in. long; pedicels bracteolate, ·1 in. long or less, rusty-tomentose. *Sepals* orbicular, rusty-pubescent. *Corolla* white, or white tinged with pink, ·45 in. wide; lobes spreading, glabrous within; interlobular spaces densely rusty-pubescent externally; lobules ovate acute, their margins sub-entire. G. Don Gen. Syst. IV. 392; Clarke in Hook. f. Flor. Brit. Ind. IV. 181; Prain Journ. As. Soc. Beng. LXIII. 2. 84; Hallier f. Bull. Herb. Boiss. V. 737. *E. ferruginosa*, Griff. Notul. IV. 283. *E. paniculata*,  $\beta$ . *expansa*, Choisy Ann. Sc. Nat. 2. I. 222; DC. Prod. IX. 464. *E. coriacea*, Kurz For. Flor. Burm. II. 213 *partly* (not of Wall.).

KEDAH: Lankawi, *Curtis* 2128!—DISTRIB. Tenasserim.

4. *ERYCIBE PRINCEI*, Wall. Cat. 1335. A large straggling bush with spreading branches, or a stout climber; branches glabrous, the bark more or less fissured but quite cylindric; branchlets densely rusty-tomentose, cylindric. *Leaves* obovate-oblong or rarely obovate-lanceolate, narrowed slightly to the narrowly truncate or sometimes rounded base, more abruptly to the shortly acuminate or acute apex, with an obtuse or occasionally acute tip; 2·5 to 4 in. long, 1·25 to 1·75 in. wide; coriaceous, shrinking somewhat irregularly when dry; glabrous rather pale green above, beneath at first rusty pubescent with a loose tomentum, which soon disappears except from the midrib; lateral nerves 5 to 7 pairs, very oblique and not very prominent on either surface, with a distinct sub-marginal looping vein; secondary reticulate venation distinct but not prominent on either surface; petiole ·2 to ·25 in. long, rusty-pubescent. *Flowers* in axillary cymes in the uppermost leaf axils, 5–9-flowered, ·75 in. wide, the ultimate 3 to 7 passing into a terminal panicle without leaves 1·5 to 3 in. long, rarely longer; peduncles ·15 to ·25 in. long, rusty-pubescent; pedicels very short and lanceolate bracteoles, ·2 in. long, rusty-pubescent. *Sepals* orbicular, coriaceous, rusty-pubescent. *Corolla* greenish, sweet-scented, ·4 in. across; lobes slightly spreading; interlobular spaces shining golden silky externally; lobules ovate, margins finely undulate. *Fruit* ellipsoid, black, smooth, ·6 in. long, ·35 in. in diam. Choisy in Ann. Sc. Nat. 2. I. 224; DC. Prod. IX. 464; Clarke in Hook. f. Flor. Brit. Ind. IV. 152; Prain Journ. As. Soc. Beng. LXIII. 2. 85; Hallier f. Bull. Herb. Boiss. V. 737 (excluding the Assam and Khasia localities), 1052. *E. campotobotrya*, Miq. Flor. Ind. Bat. Suppl. 578.

MALACCA: *Griffith* 5883 (K.D.)! *Maingay* 1155 (K.D.)! SINGA-



PORE: in hedges, frequent, *Kurz* 2968! *Hullett* 628! 642!—DISTRIB. Bangka, Sumatra, Borneo.

5. *ERYCIBE MALACCENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A stout spreading shrub with straggling branches, or a climber extending to 100 feet in length; branches glabrous, with fissured bark, but cylindric; branchlets stellately puberulous, rather distinctly angled. *Leaves* elliptic, oblong or obovate-oblong, narrowed from the middle or beyond to the cuneate or narrowly truncate base and more abruptly to the shortly acuminate apex with obtuse tip; 3 to 3·5 in. long, 1·25 to 1·5 in. wide; thickly chartaceous; dark green, shining, quite glabrous above; paler glaucescent beneath and at first pubescent with a deciduous tomentum which soon disappears except from the rusty midrib; lateral nerves 5 to 6 pairs, usually very oblique, rather distinct on both surfaces as is the secondary reticulate venation; petiole ·25 in. long, rusty-tomentose. *Flowers* in axillary 5–9-flowered cymes, ·5 in. wide; peduncles ·2 to 1·5 in. long, rusty-tomentose; bracteoles elliptic, fulvous-tomentose, small; pedicels ·15 in. long, rusty. *Sepals* orbicular, fulvous-tomentose. *Corolla* glabrous within, white, ·35 in. across; lobes slightly spreading; interlobular spaces fulvous-tomentose externally; lobules ovate, margins slightly undulate. *Fruit* ellipsoid, purple, ·75 in. long, ·5 in. in diam. with a faint apical areola, glabrous. *Prain Journ. As. Soc. Beng.* LXIII. 2. 85; *Hallier f. Bull. Herb. Boiss.* V. 738.

PERAK: Larut, *King's Collector* 3093! 3180! 3575! *Scortechini* 2196! Kota, *Wray* 2412! PENANG: *Maingay* 1154! MALACCA: Bukit Labukor, *Ridley* 3526! Batu Tiga, *Derry* 1042!—DISTRIB. Tenasserim.

6. *ERYCIBE ANGULATA*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 84. A robust scandent shrub or a strong climber; stems sometimes over 100 feet long and 4 to 6 in. in diam.; branches terete, glabrous; ultimate branchlets angular, rusty-pubescent. *Leaves* obovate, base cuneate or rounded, apex shortly acuminate or rounded or sometimes deeply emarginate (normally shortly acuminate); 4 to 8 in. long, 2 to 4 in. wide; coriaceous, quite glabrous; lateral nerves 5 to 8 pairs, visible above, distinctly raised beneath; secondary venation indistinct; petioles ·5 in. long, rusty-pubescent. *Flowers* in few-flowered cymes disposed in axillary and terminal panicles with angular rachis clothed with dark-red tomentum; axillary inflorescences 1 to 6 in. long, 1 to 1·5 in. wide, terminal 7 to 10 in. long, with sometimes floral leaves intermixed; pedicels bracteolate, ·25 to ·5 in. long. *Sepals* orbicular, outer stellately rusty-tomentose, inner ciliate. *Corolla* white, ·5 in. wide; lobes spreading; interlobular spaces hirsute externally; lobules glabrous, ovate-oblong, with slightly undulate margins. *Hallier f. Bull. Herb.*

Boiss. V. 739. *E. paniculata*, Miq. Flor. Ind. Bat. Suppl. 248 (not of Roxb.).

PERAK: Larut, *King's Collector* 7379! Dijong, *Scortechini* 1816!—

DISTRIB. Sumatra (*Teysmann* 3682).

When originally describing this species the writer referred to it a Java specimen collected by Kurz; Dr. Hallier, however, whose knowledge of *Convolvulaceæ* is so profound, has shown that this Java specimen, which is not a very good one, belongs in reality to a distinct species—*E. macrophylla*, Hallier f.

7. *ERYCIBE LEUCOXYLOIDES*, King MSS. ex Ridl. in Herb. Singap.; Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A very large climber with slender cylindric branches, bark fissured and covered with a close grey pubescence; branchlets numerous, very slender, rather distinctly angled, grey- or rusty-pubescent. *Leaves* sub-bifarious, ovate or ovate-lanceolate, base rounded, apex sub-acuminate or abruptly narrowed to an obtuse tip; 1 to 1.75 in. long, .4 to .6 in. wide; membranous or thinly chartaceous; quite glabrous on both surfaces; rather dark green above, paler beneath; secondary nerves about 3 pairs, very oblique and hardly visible above except in young leaves, not visible beneath even when dry and even when young; petiole .1 in. long, grey-pubescent. *Flowers* axillary, solitary; pedicels .2 in. long, somewhat recurved in fruit, grey-pubescent, bracteolate under the calyx. *Sepals* orbicular, sparsely pubescent on the centre externally, elsewhere glabrous except the ciliate margins. *Corolla* white, sweet-scented, .5 in. across; interlobular spaces brown-tomentose externally; lobules broad, semi-orbicular, entire. *Fruit* elliptic, black, smooth, glabrous, .6 in. long, .4 in. wide.

SINGAPORE: climbing in secondary jungle, *Hallier*! *Ridley* 2051, 6897! 10927! SELANGOR: Kwala Lumpar, *Curtis* 2402! JOHORE: *Ridley*!

8. *ERYCIBE FESTIVA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A climber, 60 to 70 feet long (*Kunstler*), or a small tree (*Hullett*); branches grooved but cylindric; ultimate branchlets slightly angular, sparingly pubescent. *Leaves* elliptic or oblong, base cuneate, apex usually rather long acuminate with an obtuse tip; 3 to 6 in. long, 1.5 to 2.5 in. wide; glabrous; thinly coriaceous; lateral nerves 7 to 9 pairs, distinct on both surfaces, especially beneath, secondary venation distinct beneath; petiole glabrous, .5 to .75 in. long. *Flowers* in short axillary 7–12-flowered cymes .5 to .75 in. across; peduncles .3 to .5 in. long, rusty-pubescent; pedicels rusty-pubescent, bracteolate, .12 in. long. *Sepals* orbicular, rusty-pubescent. *Corolla* pale greenish-white within, .75 in. across, lobes broad; interlobular spaces brown-tomentose externally; lobules ovate, margins erose, usually rather deeply, through-

out. Prain Journ. As. Soc. Beng. LXV. 2. 536; Hallier f. Bull. Herb. Boiss. V. 739.

PERAK: in open forest in rocky localities, at 500 to 800 feet elevation, *King's Collector* 6445! SINGAPORE: garden jungle, *Ridley* 6043! *Hullett*!

9. *ERYCIBE SAPOTACEA*, Hallier f. & Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A tree (?); branches slightly angled, with fissured bark, quite glabrous. *Leaves* elliptic, base cuneate, apex abruptly shortly acuminate with tip obtuse; 5 in. long, 2 to 2.25 in. wide; firmly coriaceous; quite glabrous on both sides; bright green and glossy above, pale beneath; lateral nerves 6 pairs, distinct above and rather prominent beneath, secondary reticulate venation very distinct on both surfaces; petiole .5 in. long, glabrous. *Flowers* in few-flowered congested, axillary subsessile cymes. *Sepals* and *Corolla* not seen. *Fruit* ovoid, quite glabrous, the epicarp very coriaceous, almost woody, wrinkled and fissured, with a rounded base and conical pointed apex, 2 in. long, 1 in. in diam.; fruiting pedicels .3 in. long, with epidermis fissured like that on the branches.

PENANG: Government Hill, *Curtis* 772!

A very distinct and striking species, the flowers of which are as yet unknown. In shape the fruit is most like that of *E. Griffithii*, but besides being about twice the size it has none of the scurfy covering of the fruit of that species. The leaves of the two are very different.

10. *ERYCIBE STAFFIANA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A shrubby or slender climber, sometimes 80 to 100 feet long; much branched; branches and glabrous branchlets cylindric. *Leaves* usually oblong or elliptic, rarely narrowly lanceolate, narrowed to a cuneate or narrowly truncate base, apex shortly acuminate with a blunt tip; 4 to 7 in. long, 2 to 3 in. wide; coriaceous; glabrous; dark green and glossy above, paler beneath; lateral nerves 4 to 6 pairs, ascending obliquely, the lowest pairs extending more than half-way along the margin, the secondary veins reticulately raised beneath, visible but not conspicuous above; petiole .25 in. long, glabrous. *Flowers* in clustered axillary cymes .5 to 2 in. long, in fascicles of 4 to 9 from a woody protuberance, each 5-20-flowered; peduncles densely dark-brown-tomentose, as are the bracteolate pedicels, .1 to .15 in. long. *Sepals* orbicular, densely brown-tomentose. *Corolla* waxy-white within, .5 in. across; lobes narrow; interlobular spaces very dark-brown-tomentose (nearly black—*Kunstler*) externally; lobules narrow, divergent, slightly crenulate along the obliquely truncate apex. *Fruit* ovoid, .6 to .8 in. long, .5 in. in diam., densely clothed with a fine dark-brown velvety tomentum. Hallier f. Bull. Herb. Boiss. V. 738.

PERAK: at various elevations from 300 to 4,000 feet, *King's Collector* 4015! 4115! 7784! *Wray* 3371! *Scortechini* 1793!—DISTRIB. Tenasserim (*Parish*).

11. *ERYCIBE PRÆCIPUA*, Prain Journ. As. Soc. Beng. LXIII. 2. 86. A large climbing shrub; branches and ultimate branchlets cylindric, glabrous. *Leaves* narrowly elliptic to elliptic, narrowed to the cuneate base and more abruptly to the obtuse tip; thickly coriaceous; quite glabrous; 1·5 to 4 in. long, ·75 to 2 in. wide; nerves about 5 pairs, curved and ascending, but all very obscure even when dry; petioles ·3 in. long, glabrous. *Flowers* in small, axillary, laxly 5–8-flowered cymes ·5 in. across; peduncles and bracteolate pedicels closely rusty-pubescent, pedicels ·12 in. long. *Sepals* orbicular, the outer minutely, the inner densely closely rusty-pubescent. *Corolla* whitish, ·5 in. wide, the lobes very narrow, spreading; interlobular spaces rufous-pubescent internally as well as externally; lobules small glabrous, narrowly oblong, sub-acute, divergent. *Fruit* ovoid, slightly rough but not verrucose, ·7 to ·75 in. long, ·5 to ·6 in. wide, pointed or rounded.

PENANG: Government Hill, *Curtis* 911! 1273! PERAK: Larut, *Scortechini*!

Father Scortechini's specimens from Perak have the fruit slightly smaller, not at all pointed, and not so distinctly roughened as the Penang specimens, but in all other respects the two plants agree.

12. *ERYCIBE GLOMERATA*, Bl. Bijdr. 1047. A shrub or a small tree, 10 to 20 feet high, erect, much spreading; branches and sparingly pubescent ultimate branchlets cylindric. *Leaves* elliptic or narrow-oblong, shortly or gradually narrowed to the cuneate base and to the obtuse tip; 7 to 12 in. long, 1·75 to 5 in. wide; coriaceous; quite glabrous; dark green above, waxy-pale greenish-yellow (*Kunstler*) beneath; lateral nerves 8 to 9 pairs, visible but not raised on either surface or only faintly raised beneath; petiole ·15 to ·35 in. long. *Flowers* in axillary very short and closely glomerate 5–8-flowered cymes; peduncles ·05 in. long; individual flowers nearly sessile with 3 rusty-pubescent bracteoles at the base of the calyx. *Sepals* almost glabrous, pale waxy-green (*Kunstler*), orbicular, margins ciliate. *Corolla* pure white within, 1·25 in. across; lobes narrow; interlobular spaces rufous externally; lobules oblong, obtuse, slightly crenulate at the apex. Hallier f. Bull. Herb. Boiss. V. 382, 739. *E. albida*, Prain Journ. As. Soc. Beng. LXIII. 2. 87.

VAR. *typica*; leaves elliptic, 3·5 to 5 in. wide.

PERAK: on Gunong Bubu, 2,500 to 3,000 feet, *King's Collector* 7373! Larut, *Scortechini*! PUNGAH: *Curtis* 2947!—DISTRIB. Java.

VAR. *longifolia*, Bl. Bijdr. 1047; leaves cuneate-oblong, obtusely acuminate, 1·75 to 2·25 in. wide. *E. angustifolia*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Waterfall Hill, Wray 2580! MALACCA: Bujong, Scortechini 1908!—DISTRIB. Java, Borneo.

13. *ERYCIBE AENEA*, Prain Journ. As. Soc. Beng. LXIII. 2. 85. A very large climber; stems 70 to 150 feet long, 3 to 4 in. in diam.; branches and densely rusty-tomentose branchlets cylindric. Leaves narrowly oblong or elliptic, base cuneate, apex gradually or oftener abruptly narrowed to an obtuse tip; thickly coriaceous; quite glabrous; 2·5 to 5 in. long, 1 to 2 in. wide; lateral nerves 5 to 6 pairs with a distinct sub-marginal connecting nerve, impressed on both surfaces but especially beneath; petiole ·25 in. or less. Flowers in axillary 3–20-flowered cymes ·25 to 1·2 in. long; peduncles and bracteolate pedicels minutely closely rusty-tomentose; pedicels ·12 in. long. Sepals orbicular, closely brown-tomentose. Corolla pale yellow, ·5 in. across, the lobes spreading; interlobular spaces pale brown-tomentose externally; lobules ovate-oblong, their margins undulate. Fruit elliptic, verrucose, grey, ·9 in. long, ·5 to ·6 in. wide. Hallier f. Bull. Hort. Boiss. V. 739.

PERAK: Larut, at elevations of from 300 to 2,500 feet, King's Collector 7337! 8165!

14. *ERYCIBE GRIFFITHII*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A climber 60 to 80 feet long; stem 4 to 6 in. in diam.; branches cylindric, glabrous; branchlets cylindric, sparingly rusty-pubescent. Leaves elliptic, rarely ovate-lanceolate or obovate-oblong, base cuneate or rarely rounded, apex usually abruptly acuminate, less often gradually narrowed to the obtuse tip; 2·75 to 6 in. long, ·75 to 2·5 in. wide; quite glabrous on both surfaces, sub-coriaceous; lateral nerves 6 to 8 pairs, very oblique, visible but not prominent above, prominent beneath; secondary venation very indistinct; petiole ·25 to ·3 in. long, glabrous. Flowers in short axillary solitary or clustered 4–9-flowered cymes ·3 in. across; peduncles rusty-pubescent, ·2 to ·3 in. long; pedicels ·25 in. long, rusty-pubescent as are the very minute ovate-lanceolate bracteoles. Sepals orbicular, rusty-pubescent externally. Corolla waxy cream-coloured and glabrous within, ·5 in. across, the lobes spreading, narrow and stellate; interlobular spaces rusty-brown externally; lobules narrow acute, their margins sub-entire. Fruit coriaceous, greyish-brown and closely scurfy externally, 1 to 1·5 in. long, ·5 to ·75 in. wide. Prain Journ. As. Soc. Beng. LXIII. 85; Hallier f. Verslag. Buitenzorg, 1895. 126; Bull. Herb. Boiss. V. 738, 1052. *E. Maingayi*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182; Hallier f. Bull. Herb. Boiss. V. 737. *E. micrantha*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Larut, 200 to 300 feet elevation, *King's Collector* 8191! *Scortechini*! MALACCA: *Maingay*. PENANG: *Gaudichaud* 120; *Curtis* 181! *King's Collector* 1458!—DISTRIB. Tenasserim, Sumatra, Philippines.

### 3. PORANA, Burm.

Large climbers. *Leaves* petioled, ovate or cordate, entire. *Flowers* small; cymes often in large panicles; bracts persistent; bracteoles subulate or 0. *Sepals* 5, small and narrow in flower; in fruit the outer 3 or all 5 much accrescent, membranous and spreading, usually spathulate. *Corolla* white, campanulate or infundibuliform with a wide or narrow throat; limb spreading plicate, sub-entire or 5-lobed. *Stamens* 5, adnate to corolla-tube, sub-included; filaments linear or filiform. *Ovary* 2-celled or 1-celled; ovules 4 or 2; style long or short, entire or 2-fid; stigma solitary 2-lobed, or stigmas 2, capitate. *Fruit* globose oblong or obconic, 1-seeded, membranous, indehiscent or opening by 2 valves. *Seed* glabrous; cotyledons plicate.—DISTRIB. Species about 10, throughout S.E. Asia.

PORANA VOLUBILIS, Burm. Fl. Ind. 51. t. 21. f. 1. A large climber; stems and warted branches glabrous, young shoots pubescent. *Leaves* glabrous, ovate sub-cordate, or sometimes base rounded, apex shortly acuminate, quite glabrous, 2·5 in. long, 1·5 in. wide; petiole ·6 in. long. *Flowers* white, small, in sub-ebracteate cymes disposed in panicles 12 to 15 in. long, minutely tawny-pubescent; pedicels ·1 to ·25 in. long. *Sepals* 5, minutely pubescent, in flower ·2 in. long, oblong; in fruit ·35 in. long, sub-spathulate, all equal. *Corolla* ·3 in. long; tube narrow; limb rather distinctly 5-lobed. *Stamens* 5, included. *Ovary* 2-celled; ovules 4; style 2-partite; stigmas small, capitate. *Fruit* a globose capsule, enclosed in the accrescent 5–7-nerved calyx-lobes, ·15 in. in diam. *Seed* solitary. Lamk Ill. t. 186; Roxb. Fl. Ind. ed. Carey & Wall. II. 40; ed. orig. I. 465; Blume Bijdr. 723; Wall. Cat. 1327; Choisy Convolv. Or. 106, and in DC. Prod. IX. 436; Clarke in Hook. f. Flor. Brit. Ind. IV. 222.

MALACCA: *Griffith*! *King*!—DISTRIB. Indo-China, Malay Archipelago.

*King's* examples are from a cultivated plant; whether those of *Griffith* be from wild plants is unknown.

### 4. NEUROPELTIS, Wall.

Large scandent, tomentose shrubs. *Leaves* ovate or oblong, firm, petioled. *Flowers* many, small, in axillary racemes or terminal panicles; pedicels distinct, beset by solitary ovate-lanceolate bracteoles under the calyx, in flower inconspicuous, in fruit greatly accrescent.

*Sepals* 5, sub-orbicular, hardly altered in fruit. *Corolla* small, white; tube wide-campanulate; limb deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* 5, exserted or included, adnate to corolla-tube; filaments filiform. *Ovary* imperfectly or perfectly 2-celled; ovules 4; styles 2, free throughout, stigmas sub-capitate wavy or obscurely lobed. *Fruit* a globose, 4-valved, 1-seeded capsule sessile near the centre of the flat, much-accrecent bracteole. *Seed* globose, glabrous, albuminous; cotyledons plicate.—DISTRIB. Species 2, in tropics of Eastern Hemisphere.

NEUROPELTIS RACEMOSA, Wall. Cat. 1322. A robust climber; branchlets pubescent, lenticellate, rather dark. *Leaves* alternate, elliptic-lanceolate, base cuneate, apex acuminate with a narrow longish thickened mucro; lamina 2·5 to 5 in. long, 1·25 to 2·25 in. wide; firmly papery; glabrous except along the midrib above, slightly rusty with a sub-persistent pubescence beneath; lateral nerves about 7-paired, somewhat curved forward, rather prominent and pubescent beneath. *Flowers* in axillary racemes 2 to 5 in. long, peduncle ·5 to 1 in. and rachis rusty-tomentose; bracts small ovate; pedicels ·12 to ·2 in. long, tomentose, slender, with an ovate-lanceolate bracteole under the calyx. *Sepals* 5, somewhat connate below, small, orbicular, rufous-villous. *Corolla* small, campanulate, white, tube rufous-villous externally; limb ·25 to ·3 in. across, 5-lobed, lobes ovate nearly as long as the tube. *Stamens* 5, adnate to corolla-tube, exserted; filaments thickened at base. *Ovary* imperfectly or perfectly 2-celled, rufous-villous at base; ovules 2 in each cell; styles 2, glabrous; stigmas large globose wavy. *Capsule* ·25 in. long, ovoid, glabrescent, sessile in the centre of the accrescent, orbicular, scarious, reticulate bract 1 to 1·75 in. wide with rounded or cordate base. *Seed* globose, glabrous, albuminous; cotyledons plicate. Roxb. Flor. Ind. ed. Carey & Wall. II. 44; Deless. Ic. Select. V. t. 96; Choisy Convolv. Or. 109, t. 2. f. 12, and in DC. Prod. IX. 437; Bedd. Ic. Pl. Ind. Or. t. 291; Kurz For. Flor. Burm. II. 222; Clarke in Hook f. Flor. Brit. Ind. IV. 225. *N. ovata*, Wall. Cat. 1323; Choisy Convolv. Or. 110, t. 2, f. 13, and in DC. Prod. IX. 437. *N. bracteata*, Griff. Notul. IV. 285. *N. intermedia*, Griff. Notul. IV. 285.

PERAK: Larut, *Scortechini* 1483! 1489! 2071! *King's Collector* 3544! 3792! 4370! 6809! PENANG: *Wallich*! MALACCA: *Maingay* 1152! 1153! SINGAPORE: *Wallich*!—DISTRIB. Malabar, Borneo.

##### 5. EVOLVULUS, Linn.

Small prostrate or erect herbs or undershrubs, never climbing. *Leaves* small, entire, often distichous. *Flowers* small, blueish or white,

in axillary few-flowered peduncled or sub-sessile cymes. *Sepals* 5, small, sub-equal, not enlarged in fruit. *Corolla* small, funnel-shaped or sub-rotate; limb plicate, sub-entire. *Stamens* 5, included or exserted; filaments filiform. *Ovary* 2-celled or, rarely, 1-celled; ovules 4; styles 2, free from the base, each cleft into 2 linear or sub-clavate stigmas, papillose on the inner face. *Fruit* a 4-valved, less often a 2-valved capsule, 2-celled or 1-celled. *Seeds* 4 or 2, rarely solitary, glabrous; cotyledons twice plicate.—**DISTRIB.** Species about 80, mostly tropical American; the present the only Asiatic.

**EVOLVULUS ALSINOIDES**, Linn. Sp. Pl. ed. II. 392. A small perennial herb; annual branches numerous, wiry, often prostrate. *Leaves* variable in shape from lanceolate to ovate, and in pubescence from sparingly silky to densely tawny or rufous-tomentose; .25 to 1 in. or occasionally 1.5 in. long, .2 to .5 in. wide; petiole absent or short, rarely .2 in. long. *Flowers* 1 to 3, on peduncles .1 in. to 1 or 1.5 in. long; bracts small, linear, hirsute, persistent; pedicels .05 to .5 in. long. *Sepals* 5, lanceolate, hirsute, .1 to .15 in. long. *Corolla* pale blue or white, transparent, .25 to .3 in. long. *Capsule* globose, .15 in. in diam., 4-valved. *Seeds* 4, glabrous. Burm. Fl. Zeyl. 9, t. 6, f. 1; Wall. Cat. 1317; Roxb. Flor. Ind. II. 105; Choisy in DC. Prod. IX. 447; Clarke in Hook f. Flor. Brit. Ind. IV. 220. *E. linifolius*, Linn. Sp. Pl. ed. II. 392; Choisy in DC. Prod. IX. 449. *E. angustifolius*, Roxb. Flor. Ind. ed. Carey & Wall. II. 107. *E. hirsutus*, Lamk Encyc. Meth. III. 538; Ill. t. 216, f. 2; Choisy in DC. Prod. IX. 447, excl. syn. Roxb. *E. sericeus*, Wall. Cat. 1315. *Convolvulus valerianoides*, Blanco Fl. Filip. 90.

**NICOBARS:** Kamorta, *Kurz!* **SINGAPORE:** Changi, *Ridley!*—**DISTRIB.** Cosmopolitan in the tropics.

The form recorded from the Nicobars and Singapore is the narrow-leaved form, which is *E. linifolius* Linn. In both localities it is probably an introduced weed.

## 6. BONAMIA, Thouars.

Large climbing shrubs. *Leaves* large ovate-cordate, entire, firm. *Flowers* medium, in axillary peduncled cymes; bracts small. *Sepals* 5, sub-equal, firm, ovate. *Corolla* infundibuliform, tube hirsute externally except opposite the sepals; limb 5-lobed, plicate. *Stamens*, 5, included, adnate to corolla-tube; filaments filiform, at least in upper part. *Ovary* 2-celled; ovules 4; style 2-fid to the middle; stigmas 2, capitate. *Fruit* a globose or ovoid capsule; valves thin, splitting irregularly at their apices. *Seeds* normally 4, glabrous or nearly so.—**DISTRIB.** Species about 30, throughout the tropics.



BONAMIA SEMIDIGYNA, Hallier f. Engl. Bot. Jahrb. XVI. 528. A large twining shrub; stems and leaves rusty-tomentose. *Leaves* ovate-cordate, entire, apex acute; length 4 in., width 2·5 in.; petiole 1·5 in. long. *Flowers* medium, in axillary sub-capitate 2-5-flowered cymes; peduncles 1 to 2 in. long, rusty-villous as are the pedicels and sepals; bracts ·25 in. long, oblong, rusty-villous. *Sepals* ·35 to ·5 in. long, ovate-oblong, sub-acute, sub-equal. *Corolla* yellowish, wide-infundibuliform, 1·5 in. long; tube hirsute externally; limb sub-entire. *Style* ·6 in. long. *Capsule* sub-globose, glabrous, ·5 in. in diam., splitting into many vertical segments, hardly covered by the slightly accrescent, ovate fruiting sepals. *Seeds* sub-glabrous. Bull. Herb. Boiss. V. 1814. *Convolvulus semidigynus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 468; Wall. Cat. 1405. *Breweria cordata*, Bl. Bijdr. 722; Choisy in DC. Prod. IX. 438; Clarke in Hook. f. Flor. Brit. Ind. IV. 223. *B. Roxburghii*, Choisy Convolv. Or. III., and in DC. Prod. IX. 438; Wight, Ic. t. 1370; Dalz & Gibs. Bomb. Fl. 162. *B. madagascariensis*, Choisy Mem. Soc. Phys. Genev. 493.

PROV. WELLESLEY: at Kubang Ulu, *Curtis*! PENANG: on the coast, *Porter*! *Curtis* 1703! PERAK: Ipoh, *Curtis* 3166!—DISTRIB. S.E. Asia generally, Mascarenes.

#### 7. CALYSTEGIA, R. Br.

Prostrate or twining perennial herbs. *Leaves* entire or lobed, glabrous or nearly so. *Flowers* medium, axillary solitary or rarely in few-flowered cymes; bracts 2, large, leafy, embracing the calyx, persistent. *Sepals* 5, ovate or oblong, the innermost 2 rather the smallest. *Corolla* funnel-shaped or campanulate; tube glabrous externally with 5 bands in centre of component petals, each with 5 pellucid lines at the base; limb sub-entire plicate. *Stamens* 5, adnate to corolla-tube, included; filaments sub-equal. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform, entire; stigma of 2 oblong lobes. *Fruit* a globose, 1-celled, 4-valved, 4-seeded capsule. *Seeds* black, glabrous or verrucose.—DISTRIB. Species 16 to 20, in warm and temperate regions.

CALYSTEGIA HEDERACEA Wall. Cat. 1328. A prostrate or climbing weed of cultivated places and hedges. *Leaves* somewhat irregular, cordate or sagittate, lobed or rarely entire, 1 to 3 in. long, ·75 to 1 in. wide; petiole 1 in. long. *Flowers* axillary solitary; peduncles 1 in. long; bracts 2 ovate, ·3 in. across, persistent, enclosing the calyx. *Sepals* 5, oblong, obtuse, glabrous, outer ·3 in. long, inner rather smaller. *Corolla* sub-campanulate, pinkish purple, tube 1 in. long; limb plicate, sub-entire. *Capsule* ovoid, sub-acute, glabrous, ·3 in. long.

*Seeds* glabrous. Roxb. Flor. Ind. ed. Carey & Wall. II. 94; Choisy Convolv. Or. 103, and in DC. Prod. IX. 434; Clarke in Hook. f. Flor. Brit. Ind. IV. 217. *Convolvulus Wallichianus*, Spreng. Syst. cur. post. 61.

PENANG: *Porter*, fide Wallich.—DISTRIB. Northern India, Afghanistan, Eastern Asia.

Possibly only a casual weed in our area.

#### 8. HEWITTIA, W. & A.

A pubescent twining herb. *Leaves* cordate, entire angled or lobed. *Flowers* axillary solitary, or in few-flowered cymes; bracts below the calyx 2, linear-lanceolate. *Sepals* 5, acute; outer 3 wide-ovate, accrescent in fruit, inner 2 narrow-lanceolate. *Corolla* medium, yellow or white with a purple eye; tube campanulate; limb plicate. *Stamens* 5, included, adnate to corolla-tube; filaments linear with dilated bases. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. *Fruit* a globose, 4-valved, 1-celled, normally 4-seeded capsule. *Seeds* black, glabrous.—DISTRIB. A single species, throughout the tropics of the Eastern Hemisphere and Polynesia.

HEWITTIA BICOLOR, Wight Ic. t. 835. A pubescent perennial herb; stems twining. *Leaves* cordate, entire angled or lobed, pubescent, 2 to 4 in. long; petiole .5 in. long. *Flowers* on axillary 1-few-flowered peduncles .5 to 4 in. long; bracts 2, narrow-lanceolate, .25 to .5 in. long, situated a short distance below the calyx. *Sepals* 5, the outer ovate, accrescent; the inner narrowly lanceolate, .3 to .5 in. long. *Corolla* yellow or whitish with a purple patch in lower part of tube, rather widely campanulate, 1 in. long; tube externally hirsute; lobes 5, very short. *Stamens* 5, included; filaments linear with dilated bases. *Ovary* hirsute, more or less perfectly 2-celled; ovules 4; style filiform; stigmas 2, ovate-oblong. *Fruit* a globose capsule, .25 in. in diam., 1-celled, opening by 4 valves. *Seeds* 4, black, glabrous. Wight Ill. t. 168; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus bicolor*, Vahl. Symb. III. 25; Bot. Mag. t. 2205; Roxb. Hort. Beng. 14; Flor. Ind. I. 475; Flor. Ind. ed. Carey & Wall. II. 57; Wall. Cat. 1410. *C. bracteatus*, Vahl Symb. III. 25. *C. involucratus*, Ker in Bot. Reg. t. 318 (not of Spreng.). *Ipomœa bicolor*, Sweet Hort. Brit. ed. 2, 372. *I. bracteata*, Bl. Bijdr. 711 (not of Willd. nor of Wight). *I. Weinmanni* Roem. & Schult. Syst. Nat. IV. 243. *Calystegia Keriana*, Sweet Hort. Brit. ed. 2, 370. *Palmia bicolor*, Endl. ex Dalz. & Gibs. Bomb. Flor. 163. *Shuteria bicolor*, Choisy Convolv. Or. 104, and in DC. Prod. IX. 435; Flor. des Serres t. 421. *Aniseia Afzelii*, G. Don Gen. Syst. IV. 295. *A. bracteata*, Hassk. Pl. Jav. Rar. 516.

PERAK : Larut, *Scortechini* !—DISTRIB. Tropical Africa, S.E. Asia generally, Polynesia.

9. ANISEIA, Choisy.

Twining herbs. *Leaves* elliptic, mucronulate or lanceolate. *Flowers* axillary, solitary or in few-flowered cymes. *Sepals* 5, herbaceous, acuminate ; outer 3 the larger, ovate, decurrent on the peduncle and accrescent in fruit ; inner 2 smaller, lanceolate, unaltered in fruit. *Corolla* wide-infundibuliform ; tube hirsute externally except on spaces opposite the sepals, with 5 distinct vertical bands ; limb sub-entire. *Stamens* 5, adnate to corolla-tube, included ; filaments filiform. *Ovary* glabrous, 2-celled ; ovules 4 ; style filiform ; stigma 2-globose. *Fruit* a 2-celled, 4-valved capsule. *Seeds* 4, large, black, smooth.—DISTRIB. Species about 5, all confined to America but one, which is cosmopolitan in the tropics.

ANISEIA MARTINICENSIS, Choisy Convolv. Rar. 144. A slender herb creeping in wet places or climbing, glabrous or with a few adpressed hairs. *Leaves* oblong-lanceolate, apex obtuse with a mucro, base cuneate ; glabrescent ; .75 to 3 in. long, .5 to 1 in. wide ; petiole .6 in. long. *Flowers* axillary solitary ; peduncles 1 in. long, with 2 minute, persistent bracts about the middle. *Sepals* unequal, the outer ovate-acute .6 in. long, the inner narrower, green, glabrescent ; in fruit accrescent at length .75 to 1 in. long, the 2 outer then sub-cordate-ovate scarious, strongly nerved, decurrent on the peduncle ; the inner lanceolate. *Corolla* white, campanulate, tube 1 in. long, pubescent outside ; limb 1 in. across. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* with minutely strigose margins. Choisy in DC. Prod. IX. 430 ; Hallier f. Engl. Bot. Jahrb. XVIII. 96, and Bull. Herb. Boiss. V. 382. *A. uniflora*, Choisy Convolv. Or. 101, t. 2, f. 9, and in DC. Prod. IX. 431 ; Wight Ic. t. 850. *Convolvulus martinicensis*, Jacq. Am. 20, t. 17. *C. uniflorus*, Lamk Encyc. Meth. III. 544 ; Burm. Fl. Ind. 47, t. 21. *C. emarginatus*, Vahl Symb. III. 23. *C. Rheedei*, Wall. Cat. 1358 ; Roxb. Flor. Ind. ed. Carey & Wall. II. 70. *Ipomœa martinicensis*, Mez Prim. Fl. Esseq. 98. *I. uniflora*, Roem. & Schult. Symb. IV. 247 ; Clarke in Hook. f. Flor. Brit. Ind. IV. 201. *I. lanceolata*, G. Don Gen. Syst. IV. 282.

PERAK : Kwala Dipong, *Scortechini* 1780 ! Kota Bahru, *King's Collector* 1075 ! MALACCA : *Griffith* !—DISTRIB. Tropics generally.

10. JACQUEMONTIA, Choisy.

Climbing or twining herbs or undershrubs ; stems and leaves usually pubescent. *Leaves* usually cordate or elliptic, entire or rarely toothed or lobed. *Flowers* axillary, in compound umbellate or capitate

cymes, very rarely solitary; bracts small, rarely leafy. *Sepals* 5, equal or unequal. *Corolla* usually small; tube infundibuliform with a wide or narrow throat, and with 5 vertical bands each ending in 2 distinct nerves; limb plicate. *Stamens* 5, adnate to corolla-tube, included. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigmas 2, linear or elliptic-oblong. *Fruit* a globose 2-celled capsule, usually 8-valved, rarely 4-valved. *Seeds* normally 4, usually glabrous, often slightly winged along the margins.—**DISTRIB.** Species 60 to 70, mostly in Brazil; 2 to 3 in S.E. Asia.

*JACQUEMONTIA PANICULATA*, Hallier f. Engl. Bot. Jahrb. XVI. 541; XVIII. 95. A slender climber; stems twining, puberulous. *Leaves* ovate-cordate, acute, entire, pubescent beneath, puberulous at length glabrescent above, 1·5 to 3 in. long, 1 to 2 in. wide; petiole ·5 to 1 in. long. *Flowers* axillary, in small dense many-flowered sub-capitate cymes; peduncles puberulous, 1 to 1·5 in. long; bracts inconspicuous. *Sepals* 5, ovate-cordate, pubescent, ·25 in. long, not altered in fruit. *Corolla* tubular, ·5 in. long; mouth narrow, limb pink or white, shortly acutely 5-lobed. *Capsule* globose, glabrous, ·2 in. in diam. *Seeds* glabrous. *Convolvulus parviflorus*, Vahl. Symb. III. 29; Roxb. Flor. Ind. ed. Carey & Wall. II. 51; Choisy Convolv. Or. 98, and in DC. Prod. IX. 413; Clarke in Hook. f. Flor. Brit. Ind. IV. 220. *C. asclepiadeus*, Wall. Cat. 1396. *Ipomœa paniculata*, Burm. Flor. Ind. 50, t. 21, f. 3. *I. parviflora*, Pers. Synops. I. 183 (not of Vahl.).

**PERAK:** Kampong Kota, Wray 3337!—**DISTRIB.** Tropical Africa, S.E. Asia generally, Australia.

## 11. MERREMIA, Dennst.

Shrubs or herbs, usually climbing, rarely erect or prostrate; stems very rarely winged. *Leaves* entire, lobed, or divided. *Flowers* axillary, usually long-peduncled, solitary or in few-flowered, rarely many-flowered cymes; bracts small. *Sepals* 5, sub-equal, elliptic or lanceolate, acuminate, rarely rounded or truncate, convex, usually slightly accrescent in fruit. *Corolla* campanulate, white, less often yellow or orange, the tube with 5 vertical bands each usually marked by 5 dark-violet lines; limb plicate, margin slightly 5-lobed. *Stamens* 5, unequal, included or exserted; filaments filiform; anthers usually twisted; pollen never spinulose. *Ovary* 2-celled or occasionally 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule, 1–4-locular, sometimes the style separating with a small stopple. *Seeds* 4, rarely fewer, dull, glabrous, rarely puberulous.—**DISTRIB.** Species about 40, in all warm countries.

Corolla glabrous externally :—

Leaves not peltate :—

Leaves deeply 5-lobed; flowers large .. .. 1. *M. vitifolia*.

Leaves entire or very slightly lobed; flowers small :—

Sepals acuminate; flowers yellow with a pink or purple eye :—

Leaves acute at apex .. .. 2. *M. hastata*.

Leaves obtuse, truncate, or 3-toothed at apex .. 3. *M. tridentata*.

Sepals obtuse: flowers without a distinct eye :—

Leaves narrow-oblong, the lower often ovate-oblong;  
flowers white with pinkish tinge or yellowish-white or  
pale yellow .. .. 4. *M. caespitosa*.

Leaves ovate-cordate, margin often crenate or toothed;  
flowers clear yellow .. .. 5. *M. convolvulacea*.

Leaves peltate; flowers large .. .. 6. *M. nymphaeifolia*.

Corolla somewhat hirsute or shaggy externally :—

Leaves more or less hirsute; flowers in compact corymbose  
or umbellate cymes .. .. 7. *M. umbellata*.

Leaves quite glabrous; flowers in lax cymes .. .. 8. *M. crispata*.

1. *MERREMIA VITIFOLIA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A large climber with slender hispidly hairy branches. *Leaves* cordate, palmately 5-lobed, 2 to 6 in. across; lobes triangular acute, often toothed or again acutely lobed; petiole .5 to 2 in. long, hispidly hairy. *Flowers* in axillary 1-7-flowered cymes; peduncles hispidly hairy, 1 to 4 in. long, pedicels hispidly hairy, .2 to .5 in. long. *Sepals* ovate-acute, hispid, .5 in. long, in fruit somewhat enlarged, .75 in. long. *Corolla* campanulate, clear yellow, glabrous, 1.5 in. long and nearly as wide, slightly irregular. *Capsule* depressed-globose, membranous, 2-celled, normally 4-seeded. *Seeds* glabrous. Verslag. Buitenzorg, 1895, 127, and Bull. Herb. Boiss. V. 379. *Convolvulus vitifolius*, Burm. Fl. Ind. 45, t. 18, f. 1; Linn. Mantiss. 203; Roxb. Hort. Beng. 14; Flor. Ind. I. 476, and ed. Carey & Wall. II. 61; Wall. Cat. 1348. *C. angularis*, Burm. Fl. Ind. 46, t. 19, f. 2; Linn. Mantiss. 203; Hassk. Pl. Jav. Rar. 519. *Ipomœa vitifolia*, Sweet Hort. Brit. ed. II. 372; Blume Bijdr. 709; Choisy Convolv. Or. 72, and in DC. Prod. IX. 361; Kurz For. Flor. Burm. II. 219; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. angularis*, Choisy Convolv. Or. 72.

PERAK: Larut, *Scortechini*! ANDAMANS: Port Mouat, *Kurz*! Narcondam, *Prain*! NICOBARS: Nancowry, *Prain's Collector*!—  
DISTRIB. S.E. Asia generally.

2. *MERREMIA HASTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse twining biennial herb, stem angular. *Leaves* glabrous, hastate-lanceolate, 2 to 3 in. long, .3 to .5 in. wide, apex acute; petiole very short. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* narrow,

acuminate, .3 to .5 in. long, glabrous. *Corolla* funnel-shaped, .6 in. long, pale yellow with a purple eye; limb slightly lobed. *Stamens* 5; filaments slightly hairy at the base; anthers straight. *Ovary* and style glabrous; ovary 2-celled, each cell 2-ovuled. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 117. *Convolvulus hastatus*, Desr. in Lamk Encyc. Meth. III. 547. *C. filicaulis*, Vahl Symb. III. 24. *C. denticulatus*, Spreng. Syst. I. 603. *C. medius*, Roxb. Flor. Ind. I. 474, and ed. Carey & Wall. II. 56; Wall. Cat. 1346 (not of Linn.). *C. Blumei*, Dietr. Syn. Pl. I. 675. *Ipomœa denticulata*, R. Br. Prod. I. 485; Bot. Reg. t. 317 (not of Choisy). *I. filicaulis*, Bl. Bijdr. 721; Choisy Convolv. Or. 66; DC. Prod. IX. 353. *I. Blumei*, Steud. Nomencl. I. 815. *I. angustifolia*, Clarke in Hook. f. Flor. Brit. Ind. IV. 205 (not of Jacq., nor of Choisy). Rheede Hort. Malab. XI. t. 55.

PERAK: Larut, *Scortechini* 138! 1833! Kwala, &c., *Wray* 859! 1751! Sungah Ryah, *King's Collector* 996! PENANG: Batu Gaja, &c., *Deschamps*! MALACCA: *Griffith*! Tanjong Kling and Bukit Bruang, *Hervey*! PAHANG: Pekan, *Ridley*! Katapang, *Ridley* 1236! SINGAPORE: *Hullett* 69! 232! *King's Collector* 1174! *King*!—DISTRIB. Throughout S.E. Asia, Tropical Africa, and Australia.

3. *MERREMIA TRIDENTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse glabrous herb with a woody rootstock giving off many closely decumbent elongated stems. *Leaves* glabrous, hastate-oblong, or spatulate-linear, or sub-quadrate, .5 to .8 in. long, .15 to .5 in. wide, apex obtuse truncate or 3-toothed; petiole 0. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* ovate, acuminate, .25 to .35 in. long. *Corolla* funnel-shaped, .4 to .5 in. long, yellow with pink eye; limb slightly lobed. *Stamens* 5. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 116. *Convolvulus tridentatus*, Linn. Sp. Pl. 157; Roxb. Fl. Ind. I. 475, and ed. Carey & Wall. II. 56; Wall. Cat. 1347. *Evolvulus tridentatus*, Linn. Sp. Pl. ed. II. 392. *Ipomœa tridentata*, Roth Cat. Bot. II. 19; Choisy Convolv. Or. 65, and in DC. Prod. IX. 353; Clarke in Hook. f. Flor. Brit. Ind. IV. 205.

MALACCA: *Griffith* 5861/1 (K.D.)! *Maingay* 1147 (K.D.)! JOHORE: Batu Pahat, *Ridley* 11,114!—DISTRIB. India generally, Africa, Bangka.

4. *MERREMIA CÆSPITOSA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A sparsely hairy or glabrescent annual or biennial slender twining or creeping herb. *Leaves* narrowly oblong, the lower often sub-cordate and ovate-oblong, sometimes slightly hastately lobed, 1.5 to 2.5 in. long, .5 in. wide; petiole .25 to .5 in. long. *Flowers* cymose, few or many on slender peduncles 1 to 3 in. long; bracts minute, persistent. *Sepals* elliptic-obtuse, .25 in. long, margins when dry often inflexed above.

*Corolla* sub-campanulate, .75 in. long, white with a pinkish tinge or yellowish-white or yellow. *Ovary* 2-celled, each cell 2-ovuled. *Capsule* ovoid, .25 in. long, papery, 1-celled, with only a trace of the original dissepiment near the base. *Seeds* glabrous. Bull. Herb. Boiss. V. 382. *Convolvulus caespitosus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 483, and ed. Carey & Wall. II. 70; Wall. Cat. 1357. *C. Bentharii*, Wall. Cat. 1393. *Hewittia caespitosa*, Steud. Nomencl. Bot. ed. II. i. 757. *Skinneria caespitosa*, Choisy Convolv. Or. 105, t. 6, and in DC. Prod. IV. 435. *Ipomœa linifolia*, Bl. Bijdr. 721; Choisy DC. Prod. IX. 369; Benth. Fl. Austr. IV. 423; Clarke in Hook. f. Flor. Brit. Ind. IV. 205. *I. setulosa*, Zoll. & Mor. Syst. Verzeichn. 51.

PERAK: Larut, *King's Collector* 2486! MALACCA: *Griffith*! SINGAPORE: *Kurz* 2976! *Hullett* 127! 387! *King*! *King's Collector* 1193!—DISTRIB. E. Himalaya, Indo-China, Malay Archipelago, Australia.

5. MERREMIA CONVULVULACEA, Dennst. Schl. Hort. Malab. 39. A much-twining glabrous or casually hirsute often muricated herb. *Leaves* ovate-cordate, acute, glabrous, margin usually crenate or toothed, sometimes 3-lobed, 1 to 2 in. long, .5 to 1 in. wide; petiole .5 to 2 in. long. *Flowers* numerous, rather densely cymose, on axillary peduncles .5 to 3 in. long; bracts small, caducous. *Sepals* elliptic, glabrous, .2 in. long, ultimately sub-patent, margins often at length sub-involute. *Corolla* funnel-shaped, externally glabrous, yellow, .5 to .6 in. long. *Capsule* ovoid, sub-angular, at the apex rather thicker than elsewhere and often depressed, .25 in. long; cells 2. *Seeds* puberulous. *M. hederacea*, Hallier f. Engl. Bot. Jahrb. XVIII. 168, and Verslag. Buitenzorg 1895, 126. *Evolvulus hederaceus*, Burm. Fl. Ind. 77, t. 30, f. 2. *Convolvulus flavus*, Willd. Sp. Pl. 852. *C. strictus*, Vahl Symb. III. 28. *C. dentatus*, Vahl Symb. III. 25; Roxb. Flor. Ind. ed. Carey & Wall. II. 62; Wall. Cat. 1349. *Ipomœa striata*, Poir. in Lamk Encyc. Meth. Suppl. IV. 632 (*not of* Roth). *I. dentata*, Willd. ex Roem. & Schult. Syst. IV. 789. *I. subtriflora*, Zoll. & Mor. Verzeichn. 51.

PERAK: Durian, *King's Collector* 397! Larut, *Scortechini* 1832! PAHANG: Khol, *Ridley* 2168! JOHORE: Serom, *Ridley*! SINGAPORE: *Dorward*!—DISTRIB. S.E. Asia, Africa, Australia.

6. MERREMIA NYPHEIFOLIA, Hallier f. Verslag. Buitenzorg, 1895, 127. A large woody climber. *Leaves* orbicular-ovate, shortly acuminate, entire, glabrous on both surfaces, peltate with a rounded or slightly retuse base, 6 to 10 in. long, 5 to 8 in. wide, the floral leaves more deeply cut and at times cordate with a narrow sinus. *Flowers* large, in loose 4-15-flowered cymes on a common peduncle sometimes shorter

than the petioles, sometimes longer than the leaves. *Sepals* broad, obtuse, coriaceous, nearly equal, in flower .75 in., in fruit nearly 1 in. long. *Corolla* wide-campanulate, 2 to 2.5 in. long, glabrous externally, yellow or white or purplish. *Stamens* 5; anthers hirsute. *Capsule* sub-globose, 1 in. in diam. *Seeds* pilose. *Ipomœa nymphaeifolia*, Bl. Bijdr. 719; Prain Journ. As. Soc. Beng. LXIII. 2, 107. *I. Rumphii*, Miq. Flor. Ind. Bat. II. 605. *I. peltata*, Choisy, Convolv. Or. 70, and in DC. Prod. IX. 359; Miq. Flor. Ind. Bat. II. 605; Benth. Flor. Austral. IV. 408; Bak. Flor. Maurit. 208. *Convolvulus peltatus*, Linn. Sp. Pl. 1194. *Spiranthera peltata*, Boj. Hort. Maurit. 226. *Operculina peltata*, Hallier f. Engl. Bot. Jahrb. XVI. 549; XVIII. 119. *Chironia lanosanthera*, Nav. & Fernand. Vill. in. Blanco Flor. Fil. ed. III. Ic. II. t. 261, f. 1.

PERAK: Pangkor, *Scortechini* 1074! *Ridley* 7158!—DISTRIB. Mascarenes, S.E. Asia, Australia, Polynesia.

7. *MERREMIA UMBELLATA*, Hallier f. Eng. Bot. Jahrb. XVI. 552; *VAR. orientalis*, Verslag. Buitenzorg, 1895, 132, and Bull. Herb. Boiss. V. 381. A climbing softly hairy or almost glabrous shrub, stems often 15 to 20 feet long. *Leaves* cordate or hastate, elliptic or oblong, obtuse or shortly acute, entire or very rarely sinuate or angled, nerves rather distinct, softly hairy on both surfaces, or only beneath and glabrous except the nerves above, rarely quite glabrous above and only hairy on the nerves beneath; length 1.5 to 4 in., width 1 to 3 in.; petioles often softly hairy, .2 to .6 in. long. *Flowers* in compact cymbose cymes on axillary usually softly hairy peduncles .5 to 1 in. long; pedicels .2 to 1 in. long; bracts caducous. *Sepals* elliptic, obtuse, entire or mucronate, hairy or glabrous, .25 to .3 in. long. *Corolla* tubular-campanulate, white, or white with a yellow tinge, 1 to 1.5 in. long, lobes short, at first hirsute externally. *Capsule* globose, glabrous, .3 in. wide. *Seeds* patently hirsute with blackish hairs. *Convolvulus blandus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 470, and ed. Carey & Wall. II. 50, 70; Wall. Cat. 1342. *C. cymosus*, Lamk Encycl. Meth. III. 556. *C. pentagonus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 72; Wall. Cat. 1343. *C. Rothii*, Spreng. Syst. I. 600. *Ipomœa cymosa*, Roem. & Schult. Syst. IV. 241; Blume Cat. Gewachs. Buitenz. 50; Choisy Convolv. Or. 79, and in DC. Prod. IX. 371; Bot. Reg. 1843, t. 24; Clarke in Hook. f. Flor. Brit. Ind. VI. 211. *I. bifida*, Roth Nov. Sp. 118. *I. Heynei*, Roem. & Schult. Syst. IV. 237. *I. Rothii*, Roem. & Schult. Syst. IV. 241. *I. Olanda*, Sweet Hort. Brit. ed. II. 372. *I. caliginosa*, Choisy Convolv. Or. 79, and in DC. Prod. IX. 370.

PERAK: Thaipeng, *Scortechini*! Krian, *Scortechini*! Larut, *King's Collector*! PENANG: *Wallich*! *King*! *Deschamps*! SELANGOR:



*Ridley!* ANDAMANS: very common. NICOBARS: *Kurz!* *Prain!*—  
DISTRIB. E. and S.E. Asia, Tropical Africa.

VAR. *occidentalis*, Hallier f. Verslag. Buitenzorg 1895, 127. *Leaves* wide-cordate, softly hairy on both sides, 4 in. long, 3·5 in. wide; *cymes* umbellate; *corolla* yellow. *Convolvulus umbellatus*, Wall. Cat. 2329. *Ipomœa umbellata*, Mez Prim. Flor. Esseq. 99. *I. cymosa*, var. *culta*, Prain Journ. As. Soc. Beng. LXIII. 2, 108.

PERAK: Sungah Ryah, *Kunstler* 912!—DISTRIB. Bengal, naturalised; Tropical America.

8. MERREMIA CRISPATULA, Prain Beng. Pl. II. 730; var. *andamanica*, Prain. A large glabrous scandent herb. *Leaves* ovate-cordate, acuminate, margins entire or faintly undulate, glabrous on both surfaces, 3 to 4 in. long, 2·5 to 4 in. wide; petiole 1 to 1·5 in. long. *Flowers* in axillary few-flowered cymes, peduncles 1·5 to 2 in. long, pedicels ·75 to 1·25 in. long, thickened upwards. *Sepals* orbicular, ·5 in. long, in fruit ·75 in. long. *Corolla* campanulate, limb hardly lobed, tube hirsute externally, yellow, 1·25 in. long. *Capsule* sub-orbicular, ·75 in. across. *Seeds* minutely velvety, margins somewhat shaggy. *Ipomœa petaloidea*, var. *andamanica*, Prain Journ. As. Soc. Beng. LXIII. 2, 110.

ANDAMANS: S. Andaman, common.

This is in all probability specifically distinct from *Merremia crispata* (*Ipomœa petaloidea*, Choisy), but it seems preferable to treat it for the moment as a variety of that species and not as a new species, because of its remarkable resemblance to *Merremia Riedeliana*, Hallier f. (*Ipomœa Riedeliana*, Oliv.), and *Merremia mammosa*, Hallier f. (*Ipomœa mammosa*, Choisy). From the former, as described and figured by Oliver, this differs in having a 4-celled ovary with 1 ovule in each cell, whereas *M. Riedeliana* has a 2-celled ovary with 4, sometimes 5, ovules in each cell. From *M. mammosa*, as figured by Rumphius, this differs in having obtuse calyx-lobes and a shaggy corolla; Rumphius' figure shows the sepals acute and the corolla glabrous. This plant appears to be the same thing as *Convolvulus platypeltis*, Span., from Timor, and if it proves to be distinct alike from *M. Riedeliana* and *M. mammosa*, which last is cited by Dr. Hallier as an Andaman plant, though we have no authentic example of *M. mammosa* from the Andamans at Calcutta, the name it should bear will be *Merremia platypeltis*.

## 12. OPERCULINA, Manso.

Large herbaceous climbers; stems, peduncles and petioles usually winged. *Leaves* large, entire or lobed, rarely peltate. *Flowers* large, showy, axillary, solitary or often in few-flowered cymes. *Sepals* 5, large, ovoid, glabrous, accrescent in fruit and ultimately irregularly splitting from the tip. *Corolla* infundibuliform, rarely campanulate; tube with 5 vertical smooth bands. *Stamens* 5; filaments filiform; anthers large, at length contorted; pollen never spinulose. *Ovary* 2-celled, glabrous; ovules 4; style filiform; stigma 2-globose. *Fruit* a capsule, not

opening by valves; the epicarp circumscissile above the middle, the cap in separating carrying away the style; the endocarp at first entire, at length rupturing irregularly. *Seeds* usually solitary, rarely more than one, black, smooth or furred, usually large.—**DISTRIB.** Species 15, tropics generally.

Stems winged; bracts large, coloured; flowers white or pale yellow; leaves softly pubescent, not palmate .. .. 1. *O. Turpethum*.  
 Stems not winged; bracts small: flowers brilliant yellow; leaves glabrous, deeply palmately lobed .. .. 2. *O. tuberosa*.

1. **OPERCULINA TURPETHUM**, Manso En. Pl. Bras. 16, n. 49. A stout softly pubescent climber, with strong twining 4-angled or compressed less often sub-cylindric winged stems, wings membranous. *Leaves* large, ovate or oblong, obtuse or acute, 2 to 5 in. long, 1 to 3 in. wide, base cordate or truncate; petiole 1 in. long. *Flowers* axillary, in few-flowered cymes; peduncles 1 to 4 in. long; bracts oblong, 1 in. long, sometimes pinkish-purple, caducous. *Sepals* 5, ovate, softly pubescent, .5 in. long; in fruit accrescent orbicular, concave, scarious and fissile, 1 in. long. *Corolla* white or pale yellow, tubular-campanulate, 1.5 in. long. *Stamens* 5, included, anthers at length contorted. *Capsule* globose, .5 to .75 in. across. *Seeds* 4 or fewer, glabrous. Hallier f. Engl. Bot. Jahrb. XVIII. 120, and Verslag. Buitenzorg, 1895, 128. *Convolvulus Turpethum*, Linn. Sp. Pl. 155; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 57, and Flor. Ind. I. 476; Wall. Cat. 1371; Bot. Mag. t. 2093; Hassk. Pl. Jav. Rar. 518. *C. anceps*, Linn. Mantiss. 43. *C. triqueter*, Vahl Symb. III. 30. *Ipomœa Turpethum*, R. Br. Prod. I. 485; Bot. Reg. t. 279; Chois. Convolv. Or. 68, and in DC. Prod. IX. 360; Kurz For. Flor. Burm. II. 218; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. anceps*, Roem. & Schult. Syst. IV. 231; Bl. Bijdr. 714; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360. *I. triquetra*, Roem. & Schult. Syst. IV. 231. *Spiranthera Turpethum*, Boj. Hort. Maurit. 226. *Argyreia alulata*, Miq. Flor. Ind. Bat. II. 587.

**ANDAMANS:** Narcondam, *Prain*! **NICOBARS:** Kamorta, *Kurz*! **MALACCA:** *Griffith*!—**DISTRIB.** E. Africa, S.E. Asia, Australia, Polynesia.

2. **OPERCULINA TUBEROSA**, Meissn. in Mart. Fl. Bras. VII. 212. A stout glabrous climber with strong twining smooth or muricate stems. *Leaves* large, ovate, deeply palmately lobed; lobes elliptic-lanceolate, acuminate, entire, 3 to 5 in. across; petiole 2 to 5 in. long. *Flowers* axillary in many-flowered cymes; peduncles 2 to 6 in. long; bracts deciduous; pedicels .25 to 1 in. long. *Sepals* 5, elliptic-oblong, obtuse; accrescent in fruit and spreading, ultimately 2 in. long, 1 to 1.5 in. wide. *Corolla* yellow, tubular-campanulate, 2 in. long. *Stamens* 5, included,

anthers twisted. *Capsule* globose, .3 in. wide; peduncle somewhat thickened. *Seeds* furred along the angles. Hallier f., in Engl. Bot. Jahrb. XVI. 476, 549; XVIII. 119; Verslag. Buitenzorg 1895, 128, and Bull. Herb. Boiss. VII. 410. *Ipomœa tuberosa*, Linn. Sp. Pl. 160; Choisy in DC. Prod. IX. 362 (*partly*).

SINGAPORE: *Hullett* 645, in cultivation.—DISTRIB. America, Africa, India, Malaya, New Caledonia.

### LEPISTEMON, Bl.

Stout climbing herbs, with villous stems. *Leaves* cordate, often more or less lobed. *Flowers* in very dense axillary cymes; bracts narrow, deciduous. *Sepals* 5, sub-equal, herbaceous, hispid or glabrous, acute or obtuse. *Corolla* small, yellowish-white; tube hirsute externally, narrowed and shortly cylindric at base, urceolate above; limb shortly 5-lobed. *Stamens* 5, included; filaments dilated at their bases into 5 sub-equal, concave scales arched over the ovary; *disk* large cupular. *Ovary* 2-celled; ovules 4; style very short; stigma 2-partite, sub-capitate. *Fruit* a 4-valved capsule. *Seeds* glabrous.—DISTRIB. Species 3, S.E. Asiatic and African.

LEPISTEMON FLAVESCENS, Bl. Bijdr. 722. A climber with stout fulvous-villous stems. *Leaves* ovate-cordate, acute, entire or often distinctly 3-lobed, densely tawny-tomentose on both surfaces; 3 to 5 in. wide; petiole 1 to 2 in. long. *Flowers* yellowish-white in closely 10-30-flowered axillary cymes, sessile or on short peduncles .25 to .5 in. long; bracts tawny-hirsute, .2 in. long, deciduous. *Sepals* 5, rather narrowly ovate to lanceolate, sub-acute to rather finely acuminate, densely patently sub-strigose, .35 to .4 in. long. *Corolla* narrow and hyaline at the base, membranous and from slightly to widely urceolate above; tube hirsute externally; limb widely infundibuliform. *Stamens* 5, the basal processes papillose or hirsute, included in the lower part of the corolla-tube and overarching the short style; filaments glabrous, included in the upper part of the corolla-tube. *Ovary* 2-celled; ovules 4; style very short; stigma 2-lobed, lobes sub-globose. *Capsule* ovoid, glabrous, 2-celled, 4-valved, .25 in. long, normally 4-seeded. *Seeds* glabrous. Miq. Flor. Ind. Bat. II. 629; Prain Journ. As. Soc. Beng. LXIII. 2, 111; Wight Ic. t. 1362; Choisy in DC. Prod. IX. 348. *L. Wallichii*, Choisy Convolv. Or. 61, and in DC. Prod. IX. 348; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus cephalanthus*, Wall. Cat. 1402. *C. binectariferus*, Wall. in Roxb. Flor. Ind. ed. Carey & Wall. II. 47. *Vallaris controversa*, Spreng. Syst. cur. post. 65. *Ipomœa Wallichii*, Steud. Nomencl. Bot. *Nemodon* sp., Griff. Notul. IV. 286.

PERAK : Larut, *Scortechini* n. 1544 ! Goping, *King's Collector* 987 ! 1059 !—DISTRIB. Assam, Tenasserim, Chittagong, Java, Borneo, Philippines.

The three gatherings from Perak agree with each other in every respect. They differ from the plant as it occurs in Tenasserim, in having a more widely urceolate corolla and even longer and more lanceolate sepals ; at the same time they differ from the plant as it occurs in the Malay Archipelago, in having the sepals narrowly lanceolate and acuminate, instead of ovate and sub-acute. As regards corolla, however, they are exactly like the species as it occurs elsewhere in Malaya. Since the Perak plant combines the characters of the two previously recognised species—*L. Wallichii* with long acuminate sepals and *L. flavescens* with wide-urceolate corolla—it appears to afford conclusive proof of the suggestion already made by Clarke, *l.c.*, that the Assamese and the Malayan plants are no more than forms of one somewhat variable species. An Indian form occurs in Travancore ; this has been characterised by Stapf as a distinct species, *L. leiocalyx*, probably quite justly, since the Travancore plant has quite glabrous and obtuse sepals : the same form occurs in Chittagong ; otherwise, however, the Indian plant agrees with the forms reported from Indo-China and Malaya.

#### IPOMEEA, Linn.

Herbs, rarely shrubs, twining or prostrate, less often sub-erect or erect. *Leaves* alternate, entire lobed or divided. *Flowers* axillary, solitary or in cymes, the cymes rarely paniculate, or in terminal spikes ; bracts various. *Sepals* 5, ovate or linear, equal or unequal. *Corolla* campanulate or infundibuliform ; limb plicate, very slightly 5-lobed. *Stamens* 5, included or very rarely exerted ; filaments filiform or dilated at the base, often somewhat unequal ; anthers straight or contorted ; pollen spinulose. *Ovary* 1–3-celled, rarely 4-celled ; ovules 4, rarely 6 ; style filiform ; stigma capitate, entire or 2–3-globose, rarely stigmas 2, linear. *Fruit* a 4–6-valved capsule, rarely indehiscent. *Seeds* 4, less often 6, rarely solitary, glabrous, bearded, or uniformly velvety or woolly.—DISTRIB. Species about 300, throughout the tropics.

Leaves softly pubescent or densely hirsute on both surfaces :—

Leaves deeply 5–7-lobed ; flowers densely capitate with a whorl of involucre bracts .. .. 1. *I. Pes-Tigridis*.

Leaves entire or slightly 3-lobed ; flowers in congested cymes, with often one of the bracts foliaceous .. .. 2. *I. Leari*.

Leaves glabrous or only slightly hirsute or pubescent :—

Leaves all deeply 5- or more-lobed, glabrous :—

Leaves digitately 5-lobed, lobes nearly if not quite distinct at the base ; flowers more or less white .. .. 3. *I. pulchella*.

Leaves palmately 5–7-lobed, lobes not as a rule more than three-fourths cut to the base ; flowers purplish-pink .. .. 4. *I. paniculata*.

Leaves entire or slightly lobed or if (rarely) deeply lobed the lobes only 2 :—

Flowers in few-flowered axillary cymes :—

Cymes corymbose and lax or flowers 2 or solitary :—

Terrestrial, firm-stemmed plants :—

Flowers purple :—

Leaves ovate-cordate, acute or acuminate, entire or more or less lobed :—

Cultivated species with tuberous edible roots, often without flowers, rarely with seeds .. 5. *I. Batatas*.

Wild plants or if grown in gardens with the roots not edible :—

Large stout climbers on bushes near sea-coasts; flowers large, 4 in. long; sepals obtuse .. .. 6. *I. illustris*.

Slender climbers; flowers never more than 1·5 in. long; sepals acute or acuminate :—

Climbing or trailing herbs on sea-beaches; flowers 1·5 in. long .. 7. *I. denticulata*.

Climbing herbs in gardens, or garden escapes; flowers ·5 in. long .. 8. *I. triloba*.

Leaves oblong, obtuse or 2-lobed; littoral sand-binding creepers .. 9. *I. Pes-Capræ*.

Flowers white or yellowish-white; leaves oblong or linear-oblong, emarginate, sometimes lobed, occasionally lyrate; littoral sand-binding creepers .. 10. *I. littoralis*.

Aquatic or palustrine herbs; stems soft, thick and spongy, trailing and rooting on wet mud or floating in ponds and ditches; flowers purple .. 11. *I. reptans*.

Cymes subumbellate, dense; flowers pale purple, or white with a darker purple eye .. 12. *I. sagittæfolia*.

Flowers in many-flowered rather condensed axillary panicles; flowers white, slightly tinged with pink .. { 13. *I. staphylina*,  
VAR. *malayana*.

1. *IPOMŒA PES-TIGRIDIS*, Linn. Sp. Pl. 162. A hirsute twining herb; stems patently hirsute. *Leaves* hirsute on both surfaces, deeply 5-9-lobed, lobes elliptic, acuminate, narrowed at the base; length 1 to 5 in., width 1 to 4 in.; petiole 1 to 2 in. long. *Flowers* densely capitate, on axillary hirsute peduncles ·5 to 3 in. long; the heads surrounded by a whorl of fulvous-hirsute bracts, the outer ovate or elliptic-oblong with cuneate or rounded bases 1 in. long, the inner narrower acute ·5 to ·75 in. long. *Sepals* lanceolate, acute, tawny-hirsute, ·3 to ·5 in. long, scarcely altered in fruit. *Corolla* 1·25 in. long, sparsely strigose externally, infundibuliform with rather narrow tube and abruptly widened mouth, pink. *Capsule* ovoid, ·25 in. long, glabrous, chartaceous. *Seeds* minutely velvety. Roxb. Flor. Ind. ed. Carey & Wall. II. 93; Bl. Bijdr. 709; Wight Ic. t. 836; Choisy Convolv. Or. 73, and in DC. Prod. IX. 363; Clarke in Hook. f. Flor. Brit. Ind. IV. 204; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus Pes-Tigridis*, Spreng. Syst. I. 592; Wall. Cat. 1374. *C. bryoniaefolius* Salisb. Prod. 125. *Convolvuloides palmata*, Moench. Meth. 452. Rheede Hort. Malab. XI. t. 59.

MALACCA: *Griffith!*—DISTRIB. Tropical Africa, S.E. Asia generally.

2. *IPOMŒA LEARI*, Paxt. Bot. Mag. VI. 267. A large hirsute climber, with perennial root. *Leaves* widely or deeply cordate, acute, entire or slightly 3-lobed, softly sparingly hirsute above, more densely beneath; length 3 to 6 in., width 2 to 5 in.; petiole hirsute, 2 to 3 in. long. *Flowers* in congested 3-7-flowered cymes on axillary softly pubescent peduncles 3 to 7 in. long; bracts linear acuminate .3 to .4 in. long, with casually a foliaceous bract 1.5 in. long, .3 to .5 in. wide, with a cuneate, less often sub-cordate base, close to the flowers. *Sepals* lanceolate, acuminate, .75 in. long, pubescent. *Corolla* abruptly campanulate from a narrow cylindric base, tube 2.75 to 3 in. long, purple-blue or mixed red and blue, changing with age. *Fruit* not seen. *I. congesta*, Prain Journ. As. Soc. Beng. LXIII. 2, 104 (not of R. Br.). *Pharbitis Learii*, Hook. Bot. Mag. t. 3928; Choisy in DC. Prod. IX. 343.

SINGAPORE: *Hullett!*—DISTRIB. Cultivated throughout the tropics, native of America.

Mr. Hullett, whose plant was probably an escape, notes on his specimen (*Hullett* 646): "January, 1885: blue convolvulus, wild? Have never seen it in seed."

3. *IPOMŒA PULCHELLA*, Roth Nov. Sp. 115. A glabrous twining herb. *Leaves* glabrous, digitate, 5-lobed, lobes ovate-acute, base cuneate, central largest 1.25 to 1.5 in. long, .5 to .75 in. wide, basal smallest .5 to .75 in. long, .3 to .5 in. wide; petiole glabrous, .75 to 2 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles .25 to 1.25 in. long; bracts minute, deciduous; pedicels .5 in. long, with small ovate sub-persistent bracteoles below the middle. *Sepals* ovate, glabrous, .2 to .25 in. long, the inner obtuse, the outer sub-acute. *Corolla* campanulate, 2 in. long, white or with a tinge of rose. *Capsule* globose, glabrous, .5 in. wide. *Seeds* villous. Wight Ic. 158; Choisy in DC. Prod. IX. 386. *I. palmata* Clarke in Hook. f. Flor. Brit. Ind. IV. 386 in part (not *I. palmata*, Forsk = *I. cairica*, Sweet).

MALACCA: *Maingay*. SINGAPORE: Tanglin, *Ridley* 5817!—DISTRIB. India, Indo-China.

Mr. Ridley's specimens may be from plants escaped from cultivation; they are noted as "from behind the stable, Tanglin." This is one of two species often cultivated in India under the name of the "Railway Creeper"; the other species so termed is the American *Merremia quinquefolia*, Hallier f.; the latter we have not yet received from the Malay peninsula, though it has already escaped and become domesticated near Port Blair in the Andamans.

4. *IPOMŒA PANICULATA*, R. Br. Prod. I. 486. A large scandent perennial climber with a tuberous root; stems glabrous. *Leaves* palmately 5-7-lobed, glabrous, the lobes sometimes cut almost to

the base, lanceolate or elliptic, often spathulate; length 3 to 7 in., width 2·5 to 6 in.; petiole 2 to 5 in. long. *Flowers* in many-flowered axillary cymes, on peduncles 2 to 6 in. long; pedicels ·25 to ·75 in. long; bracts deciduous. *Sepals* elliptic, shortly acute, glabrous, ·25 to ·3 in. long, enlarged and concave in fruit, ·4 to ·5 in. long. *Corolla* 1·5 to 2·25 in. long, glabrous externally, wide-campanulate, purplish-pink. *Stamens* 5, anthers straight. *Ovary* 4-celled for three-fourths of its height or throughout. *Capsule* ovoid, ·3 in. long, 4-celled throughout, 4-valved. *Seeds* woolly with long hairs which protrude from the chinks of the capsule. Bl. Bijdr. 709; Bot. Reg. t. 62; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus paniculatus*, Linn. Sp. Pl. 223; Roxb. Flor. Ind. I. 478, and ed. Carey & Wall. II. 63; Wall. Cat. 1350; Spreng. Syst. I. 591. *C. platensis*, Spreng. Syst. I. 591. *C. insignis*, Spreng. Syst. I. 592. *C. roseus*, Kunth in Humb. & Bonpl. III. 108 (not of Miller). *Ipomœa digitata*, Linn. Syst. ed. X. 924; Meissn. in Mart. Fl. Brasil. VII. 278; Choisy in DC. Prod. IX. 389; Clarke in Hook. f. Flor. Brit. Ind. IV. 202. *I. mauritiana*, Jacq. Hort. Schoenbr. II. 39, t. 200. *I. gossypifolia*, Willd. Enum. Hort. Berol. 208. *I. eriosperma*, Beauv. Fl. Owar. & Benin II. 73, t. 105. *I. insignis*, Andr. Bot. Rep. t. 665; Bot. Reg. t. 75; Bot. Mag. t. 1790. *I. tuberosa*, G. F. W. Mey. Prim. Fl. Esseq. 102. *I. platensis*, Ker-Gawl. Bot. Reg. t. 333; Bot. Mag. t. 3685; Choisy in DC. Prod. IX. 387. *Batatas paniculata*, Choisy Convolv. Or. 54, t. 1, f. 2, and in DC. Prod. IX. 339; Wight Madr. Journ. Lit. IV. t. 11. *B. edulis*, var.  $\gamma$ , Choisy in DC. Prod. IX. 339.

PERAK: *Scortechini*! PENANG: *Wallich* 1350! *Deschamps*! SINGAPORE: Chan-chu-kang, *Ridley* 3909!—DISTRIB. Cosmopolitan in the tropics.

5. *IPOMŒA BATATAS*, Lamk Encycl. Meth. VI. 14. A trailing or twining glabrous or sparingly hairy herb with tuberous roots; tubers red, white, or occasionally yellow. *Leaves* ovate-cordate, acute, entire or angular or somewhat lobed; 2 to 4 in. long, 2 to 3·5 in. wide; petiole 2 to 5 in. long. *Flowers* in few-flowered cymes, very often none produced, on axillary peduncles 1 to 4 in. long; pedicels ·25 to ·5 in. long; bracts small, lanceolate, deciduous. *Sepals* narrowly oblong, acute, the outer shorter, ·5 to ·6 in. long. *Corolla* 1 to 2 in. long, purplish, glabrous externally, campanulate. *Stamens* 5, filaments slightly hirsute at the base. *Ovary* 4-celled, glabrous, half-enveloped by the undulate disk. *Capsule* 4-celled, or casually 3-1-celled by suppression. *Seeds* glabrous. Bl. Bijdr. 712; Meissn. in Mart. Fl. Brasil. VII. 282; Clarke in Hook. f. Flor. Brit. Ind. IV. 202; Hallier f. Bull. Herb. Boiss. V. 380. *I. Catesbæi*, G. F. W. Mey. Prim. Fl.

Esseq. 103. *Convolvulus Batatas*, Linn. Sp. Pl. 154; Roxb. Flor. Ind. I. 483, and ed. Carey & Wall. II. 69; Wall. Cat. 1356. *C. indicus*, Moris. Hist. II. sect. I. t. 3, f. 4. *C. edulis*, Thunb. Fl. Japon. 84. *C. esculentus*, Salisb. Prod. 123. *Batatas edulis*, Choisy Convolv. Or. 53, and in DC. Prod. IX. 338. *B. xanthorhiza* Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 130. Rheede Hort. Malab. VII. t. 50.

PERAK: Larut; *Scortechini* 1836! but doubtless also present in other provinces, cultivated.

The Sweet Potato; very rarely seen in flower, still more rarely in fruit. A native of America, but now grown throughout the tropics.

6. *IPOMŒA ILLUSTRIS*, Prain Beng. Pl. II. 735. A glabrous climber. *Leaves* ovate or oblong, cordate or hastate, entire, glabrous, apex acuminate; nerves rather prominent; 4 to 6 in. long, 3.5 to 5 in. wide; petiole 1.5 to 2 in. long. Flowers in axillary cymes; peduncles 1 to 1.5 in. long, usually 2-3-flowered, often 1-flowered; bracts caducous; pedicels .5 to 1.5 in. long. *Sepals* orbicular, obtuse, glabrous, .3 to .4 in. long. *Corolla* rather wide-campanulate, purple, 4 to 4.5 in. long, glabrous, limb 3 in. wide. *Capsule* .5 in. wide, globose. *Seeds* with long silky hairs. *I. campanulata* var. *illustris*, Clarke in Hook. f. Flor. Brit. Ind. IV. 211.

ANDAMANS: on the coasts, everywhere. PENANG: Pulo Boetong, *Curtis* 1970!—DISTRIB. Coasts of Ceylon, Sunderbuns, Indo-China, and Malay Archipelago.

This is very nearly allied to *I. campanulata*, Linn., which appears, however, to be always an inland species, whereas this is always a littoral plant. *I. illustris* differs further in having flowers at least one-half larger, sepals quite glabrous, and fewer flowers to the cyme.

7. *IPOMŒA DENTICULATA*, Choisy in DC. Prod. IX. 379 (not of R. Br.). A glabrous trailing or twining littoral herb. *Leaves* ovate-cordate, acute, entire denticulate angled or sub-lobate, base rather deep-cordate with an obtuse sinus, firm in texture but hardly fleshy; 1 to 2.5 in. long, .75 to 1.75 in. wide; petiole 1.5 in. long. *Flowers* axillary on short 1-3-flowered peduncles, never more than 1.5 in. long; pedicels (often only one) 1 to 1.25 in. long; bracts .2 in. long, linear. *Sepals* elliptic, abruptly acute, sub-scarious, .4 in. long. *Corolla* 1.5 in. long, tube funnel-shaped, abruptly widening at the mouth, purple. *Ovary* 2-celled. *Capsule* globose, .3 in. in diam., glabrous. *Seeds* smooth. Benth. Fl. Austr. IV. 421; Clarke in Hook. f. Flor. Brit. Ind. IV. 298; Hallier f. Engl. Bot. Jahrb. XVI. 554. *I. littoralis*, Bl. Bijdr. 713 Thw. Enum. 211 (not of Boiss.). *I. subdentata*, Miq. Fl. Ind. Bat. II. 614. *I. cymosa*, Bak. Fl. Maurit. 208 (not of Roem. & Schult.). *I.*



*nicobarica*, Kurz in Journ. As. Soc. XLV. 2, 141. *Convolvulus denticulatus*, Lamk Encycl. Meth. III. 540.

PERAK: Dindings, *Scortechini* 1066! *Curtis* 3449! PENANG: Bagian Jumal, *Curtis* 1974! PAHANG: Rumpin, *Ridley*! NICOBARS: common. ANDAMANS: very common.—DISTRIB. Coasts of the Indian and Pacific Oceans, from the Seychelles to Polynesia.

This species, in the writer's experience, prefers shingle beaches, though occasionally it is to be met with on sandy beaches along with *I. biloba*.

8. *IPOMŒA TRILOBA*, Linn. Sp. Pl. 229. A twining or prostrate herb with glabrous slightly angular stem. *Leaves* cordate, acuminate to an often rounded tip, entire or toothed or occasionally 3-lobed; 1·5 to 2 in. long, 1·25 to 1·75 in. wide; petiole slender, 1·75 to 2 in. long. *Flowers* in axillary 1-4-flowered cymes; peduncles 1 to 1·5 in. long; bracts lanceolate, ·2 in. long, deciduous; pedicels ·25 to ·35 in. long. *Sepals* lanceolate, acuminate, ciliate with spreading yellowish hairs, ·35 in. long. *Corolla* tubular, purple, ·5 in. long. *Capsule* pilose. Choisy in DC. Prod. IX. 383.

SINGAPORE: *Hullett*!—DISTRIB. Cultivated in the tropics; native of America.

Under his n. 68, Mr. Hullett sent to Calcutta, in 1884, as *Ipomœa coccinea*, a mixture of two species, one of which is *Quamoclit phœnicea*, the other being *Ipomœa triloba*; as they are not noted as cultivated it seems possible that *I. triloba* may at least casually occur as an escape at Singapore. For the detection of this mixture, which had not been observed by the writer when arranging the Calcutta *Convolvulaceæ* in 1894 (see Journ. As. Soc. Beng. LXIII. 2, 83 *et seq.*), we are indebted to Dr. H. Hallier.

9. *IPOMŒA PES-CAPRÆ*, Roth Nov. Sp. 109. A glabrous extensive sand-binding creeper. *Leaves* orbicular or oblong, obtuse emarginate or 2-lobed; 1 to 4 in. long and sometimes wider than long; thick, fleshy, when dry distinctly nerved; petiole 1 to 4 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles 1 to 4 in. long; bracts ·2 in. long, lanceolate, deciduous; pedicels ·75 to 1·5 in. long. *Sepals* ovate, obtuse, glabrous, ·5 to ·6 in. long, slightly enlarged in fruit. *Corolla* tubular-campanulate, glabrous, 2 in. long, purple. *Capsule* ovoid, glabrous, ·5 in. long. *Seeds* villous. Choisy Convolv. Or. 63, and in DC. Prod. IX. 349; Meissn. in Mart. Fl. Brasil. VII. 256; Hallier f. Bull. Herb. Boiss. V. 381. *I. biloba*, Forsk. Flor. Ægypt.-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. maritima*, R. Br. Prod. 486; Bl. Bijdr. 720; Bot. Reg. t. 319. *Convolvulus Pes-Capræ*, Linn. Sp. Pl. 159; Roxb. Hort. Beng. 14, Flor. Ind. I. 486, and ed. Carey & Wall. II. 74; Wall. Cat. 1360. *C. maritimus*, Lamk Encyc. Meth.

III. 550. *C. bilobatus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 73; Wall. Cat. 1359. *Batatas maritima*, Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 159, f. 1. Rheed. Hort. Malab. XI. t. 57.

PENANG: on the coast, *Deschamps* !—DISTRIB. Sea-shores of all tropical countries.

10. *IPOMŒA LITTORALIS*, Boiss. Fl. Orient. IV. 112. A glabrous or slightly puberulous sand-binding creeper. *Leaves* oblong, emarginate or lobed, often deeply so, and sometimes linear-oblong or linear or sub-lyrate, nerves very obscure; length 1·25 to 1·5 in., width ·25 to ·75 in.; petiole 1 in. long. *Flowers* in axillary 1–3-flowered cymes; peduncles 1 in. long; bracts ·2 in. long, linear-lanceolate, sub-persistent; pedicels in fruit slightly clavate, ·75 to 1 in. long. *Sepals* ovate-obtuse or ovate-lanceolate, ·6 in. long, obtuse with or without a terminal mucro. *Corolla* white or yellowish-white, 1·75 to 2 in. long, campanulate. *Capsule* ovoid, glabrous, ·4 in. long. *Seeds* villous. Hallier f. Engl. Bot. Jahrb. XVI. 555. *I. carnosus*, R. Br. Prod. 485; Benth. Fl. Austral. IV. 419; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. acetosæfolia*, Roem. & Sch. Syst. IV. 246; Meissn. in Mart. Fl. Brasil. VII. 255, t. 94. *I. longifolia*, Benth. Pl. Hartweg. 16; Bot. Reg. 1840, t. 21. *Convolvulus littoralis*, Linn. Sp. Pl. 227. *C. acetosæfolius*, Vahl Eclog. I. 18. *C. arenarius*, Vahl Symb. I. 18. *C. carnosus*, Spreng. Syst. I. 609. *C. stoloniferus*, Cyril. Pl. Rar. I. t. 5. *Batatas littoralis*, Choisy Convolv. Or. 124, and in DC. Prod. IX. 337. *B. acetosæfolia*, Choisy in DC. Prod. IX. 338.

MALACCA: *Griffith*. PAHANG: Rumpin, *Ridley* !—DISTRIB. Sea-shores of all tropical countries.

11. *IPOMŒA REPTANS*, Poir. Encyc. Meth. Suppl. III. 460. An annual glabrous aquatic, stems prostrate on mud or floating on the surface of ditches and pools, hollow and spongy, rooting at the nodes below. *Leaves* elliptic-oblong, or cordate or hastate or oblong or lanceolate, entire or angular or sub-lobate; 3 to 6 in. long, 1 to 2·5 in. wide; petiole 1 to 6 in. long. *Flowers* in axillary 1–5-flowered cymes; peduncles 2 to 7 in. long; bracts inconspicuous; pedicels 1 to 2 in. long. *Sepals* ovate, obtuse, glabrous or faintly puberulous, ·4 in. long. *Corolla* 2 in. long, purple, infundibuliform-campanulate. *Capsule* ovoid, glabrous, ·3 in. long, 2–4-seeded. *Seeds* glabrous or very minutely closely silky. Bl. Bijdr. 714; Choisy Convolv. Or. 62, and in DC. Prod. IX. 349; Hallier f. Bull. Herb. Boiss. V. 380. *I. aquatica*, Forsk. Flor. Ægypt.-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 210. *I. repens*, Roth Nov. Sp. 110; Bl. Bijdr. 713. *I. subdentata*, Miq. Flor. Ind. Bat. II. 614. *Convolvulus reptans*, Linn. Sp. Pl. 158; Roxb. Hort. Beng. 14. *C. repens*,

Vahl Symb. I. 17; Roxb. Fl. Ind. I. 432, and ed. Carey & Wall. II. 68; Wall. Cat. 1355 (*not of Linn.*). *C. Adansonii*, Lamk Encyc. Meth. III. 560. Rumph. Herb. Amboin. V. t. 155, f. 1. Rheede Hort. Malab. XI. t. 52.

ANDAMANS: Port Blair, *Prain!* and probably in some of the other provinces.—DISTRIB. Tropics of the Eastern Hemisphere.

12. *IPOMŒA SAGITTÆFOLIA*, Burm. Flor. Ind. 50. A perennial glabrous or at times pubescent or hirsute twining herb. *Leaves* ovate-cordate, acute, glabrous or sometimes pubescent, entire or sinuate, rarely lobed, basal lobes usually rounded; length 1 to 2·5 in., width ·75–2 in.; petiole 1 to 2 in. long. *Flowers* in axillary peduncled sub-umbellate cymes; peduncles ·5 to 7 in. long; bracts small, lanceolate, caducous; pedicels ·3 to ·5 in. long, in fruit thickened and clavate. *Sepals* ovate, sub-obtuse, slightly puberulous, ·2 in. long, when dry slightly muriculate externally. *Corolla* pale purple or white with a purple eye, 1·5 to 2 in. long; tube cylindric, limb abruptly explanate. *Capsule* ·25 to ·3 in. long, ovoid, 2–4-seeded. *Seeds* furred. *I. sepiaria*, Koen. ex Roxb. Hort. Beng. 14, Flor. Ind. I. 500, and ed. Carey & Wall. II. 90; Choisy Convolv. Or. 82, and in DC. Prod. IX. 370, Wight Ic. t. 838; Clarke in Hook. f. Flor. Brit. Ind. IV. 209. *I. striata*, Roth Nov. Sp. 111. *I. Heynei*, Wall. Cat. 1387. *Convolvulus maximus*, Vahl Symb. III. 26. *C. strictus*, Vahl Symb. III. 27. *C. marginatus*, Lamk Encyc. Meth. III. 558. *C. sepiarius*, Wall. Cat. 1384. *C. incrassatus*, Wall. Cat. 1386. Rheede Hort. Malab. XI. t. 53.

KEDAH: at 100 feet elevation, *King's Collector* 1705! MALACCA: Merliman Road, *Derry* 353! SINGAPORE: *Ridley* 6660! 11261!—DISTRIB. S.E. Asia generally.

13. *IPOMŒA STAPHYLINA*, Roem. & Schult. Syst. IV. 249; var. *malayana*, *Prain Journ. As. Soc. Beng.* LXIII. 2. 106. A glabrous scandent shrub over 90 feet long. *Leaves* glabrous, rather thick, dull green on both surfaces, sub-acute rather prominently veined; 2·5 to 4 in. long; petiole 1 to 2 in. long. *Flowers* numerous in rather dense panicles, 2·5 in. long, 2 in. wide; peduncles ·5 to 1·5 in. long; bracts small, caducous; pedicels ·1 to ·25 in. long, mostly short. *Sepals* ovate, obtuse, glabrous, ·2 in. long. *Corolla* white, slightly tinged with pink; tube narrowly funnel-shaped throughout, 1 to 1·25 in. long, hardly ·3 in. wide at the throat, limb rather narrow, abruptly explanate. *Capsule* ovoid, sub-acute, ·3 in. long, 4-seeded. *Seeds* with long silky hairs. *Convolvulus polyanthus*, Wall. Cat. 1378. *Lettsomia sumatrana*, Miq. Flor. Ind. Bat. Suppl. 560.

PENANG: *Porter (Wallich 1378)!* PERAK: Larut, *Scortechini!* *King's Collector* 1119! 2538! 5091!—DISTRIB. Sumatra.

This is very like typical *I. staphylina*, a species widespread in India, but differs considerably in the shape and size of the corolla, that of true *I. staphylina* being wide-campanulate from a very short, narrow-cylindric base, usually .5 to .75, very rarely 1 in. long, and .5 to .75 sometimes 1 in. wide at the limb.

### 15. QUAMOCLIT, Mœench.

Annual twining glabrous herbs. *Leaves* cordate and angled or lobed, occasionally divided. *Flowers* axillary, in few-flowered cymes; bracts small. *Sepals* 5, sub-equal or the outer rather the smaller; their apices often sub-aristate. *Corolla* pink or red, hypocrateriform, slightly irregular; tube slender or slightly infundibuliform; limb very slightly 5-lobed, spreading. *Stamens* 5, resupinate, much exserted; filaments unequal. *Ovary* glabrous 4-celled; ovules 4; style rather longer than the stamens; stigma 2-globose. *Fruit* a 4-celled 1-valved capsule, the septa thin, persistent. *Seeds* 4, black, dull, puberulous or glabrous.—DISTRIB. Species 7, mainly American, 2 now widely spread in the tropics of the Eastern Hemisphere.

Leaves ovate-cordate, entire or lobed .. .. 1. *Q. phænicea*.  
Leaves ovate, deeply pinnately divided into numerous linear segments 2. *Q. pinnata*.

1. QUAMOCLIT PHÆNICEA, Choisy. Convolv. Or. 51, t. 1, f. 1. A weak climbing or sub-scandent herb. *Leaves* ovate-cordate acute, glabrous, entire or lobed; 2 to 3 in. long, 2 to 2.5 in. wide; petiole 2 to 4 in. long. *Flowers* in axillary lax few-flowered cymes; peduncles slender, 2 to 6 in. long; pedicels erect; bracts minute. *Sepals* 5, elliptic, abruptly acuminate, .25 in. long, unchanged in fruit. *Corolla* dark-red, or variously in cultivated forms orange or yellow; tube slender, 1 in. long; limb salver-shaped, somewhat oblique, .75 in. across. *Stamens* 5, exserted. *Capsule* smooth, ovoid, .3 in. long, completely 4-celled with membranous persistent septa. *Seeds* pubescent. Choisy in DC. Prod. IX. 336; Hallier f. Bull. Herb. Boiss. V. 1042. *Convolvulus phæniceus*, Spreng. Syst. I. 596; Wall. Cat. 1372. *Ipomœa phænicea*, Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 92, and Flor. Ind. I. 502. *I. coccinea*, Clarke in Hook. f. Flor. Brit. Ind. IV. 199.

SINGAPORE: *Hullett*!—DISTRIB. Widely naturalised throughout S.E. Asia, native of America.

This, as Dr. Hallier notes on a sheet in Herb. Calcutta, is much larger and more vigorous in all its parts than is *I. coccinea*, with which it is usually confounded in Eastern collections; it differs besides in having erect and not nodding pedicels. *I. coccinea* is not, so far as is known, semi-spontaneous anywhere in S.E. Asia; the present species is now very widespread there in a wild condition.

2. QUAMOCLIT PINNATA, Boj. Hort. Maurit. 224. A slender glabrous twining herb. *Leaves* ovate in outline, deeply pinnately divided into

numerous distant linear segments, glabrous; 3 to 5 in. long, 2 to 3 in. wide; petioles 1 to 3 in. long. *Flowers* in axillary lax few-flowered cymes; peduncles slender, 2 to 4 in. long; pedicels erect, if more than one virgate; bracts minute. *Sepals* 5, elliptic, .25 in. long, hardly changed in fruit. *Corolla* dark red, occasionally in cultivated varieties white; tube slender, 1 in. long; limb salver-shaped, somewhat oblique, .75 in. across. *Stamens* 5, exserted. *Capsule* smooth, ovoid, .3 in. long, completely 4-celled with membranous persistent septa. *Seeds* puberulous. Hallier f. Engl. Bot. Jahrb. XVIII. 154. *Q. vulgaris*, Choisy Convolv. Or. 52, and in DC. Prod. IX. 336. *Convolvulus pinnatus*, Desr. in Lamk Encyc. Meth. III. 567. *C. Quamoclit*, Spreng. Syst. I. 591; Wall. Cat. 1375. *Ipomœa Quamoclit*, Linn. Sp. Pl. 159; Bot. Mag. t. 244; Bl. Bijdr. 708; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 93, and Flor. Ind. I. 502; Clarke in Hook f. Flor. Brit. Ind. IV. 199.

PENANG: Batu Gaja jungles, *Deschamps*!—DISTRIB. Widely naturalised in S.E. Asia, native of America.

#### 16. CALONYCTION, Choisy.

Large herbaceous climbers, stems usually muricate. *Leaves* large, cordate, entire or angled. *Flowers* solitary or in few-flowered axillary cymes; bracts caducous. *Sepals* 5, herbaceous, smooth, usually aristate, sub-equal or the outer smaller. *Corolla* large, salver-shaped, white or rose-purple; tube narrow-cylindric; limb plicate. *Stamens* 5, adnate to corolla-tube, considerably exserted. *Ovary* glabrous, 2-locular; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule. *Seeds* 4, dull, glabrous.—Species 6 to 7, all tropical American, 2 now widespread and sub-spontaneous in the tropics of the Eastern Hemisphere.

CALONYCTION BONA-NOX, Boj. Hort. Maurit. 227. A large climber, stems smooth or muricate, glabrous. *Leaves* ovate-cordate, acute, glabrous, entire or casually lobed; 3 to 8 in. long, 2 to 4 in. wide; petiole 3 to 6 in. long. *Flowers* on axillary 1-5-flowered peduncles, 2 to 6 in. long; bracts caducous. *Sepals* 5, usually ovate, obtuse with a mucro, very slightly enlarged in fruit, glabrous; .5 in. long. *Corolla* 3 in. long; tube linear, .2 in. wide; limb salver-shaped, 3 to 5 in. wide, white. *Stamens* 5, slightly unequal, distinctly exserted. *Capsule* ovoid-oblong, narrowed upwards, 1 in. long; peduncle in fruit slightly thickened. *Seeds* glabrous. Hallier f. Bull. Herb. Boiss. V. 1028. *C. noctilucum*, Don in Sw. Hort. Brit. ed. III. 482. *C. speciosum*, Choisy Mem. Soc. Gen. VI. 441, t. 1, f. 4, and in DC. Prod. IX. 345; Hallier f. Engl. Bot. Jahrb. XVI. 556; XVIII. 153. *C. Roxburghii*, G. Don Gen. Syst. IV. 263. *Convolvulus aculeatus*, Linn. Sp. Pl. ed. I. 155. *C. bona-nox*

Spreng. Syst. I. 600. *C. grandiflorus*, Linn. f. Suppl. 136; Willd. Sp. Pl. I. 2. 859; Pers. Synops. I. 179; Wall. Cat. 1370. *C. latiflorus*, Desr. in Lamk Encyc. Meth. III. 561. *Ipomœa bona-nox*, Linn. Sp. Pl. ed. II. 228; Roem. & Schult. Syst. IV. 217; Bl. Bijdr. II. 712; Kurz For. Fl. Burm. II. 217; Clarke in Hook. f. Flor. Brit. Ind. IV. 197. *I. grandiflora*, Lamk Ill. I. 467, and Encyc. Meth. III. 16; Roem. & Schult. Syst. IV. 240; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 87, and Flor. Ind. I. 497. *I. Roxburghii*, Steud. Nomencl. ed. II. 1, 819. *I. noctiflora*, Griff. Not. IV. 286.

PENANG: cultivated, *Hallier*. SINGAPORE: *S. Mayer* 211.—DISTRIB. Throughout the tropics; possibly not truly wild in our area.

#### 17. ARGYREIA, Lour.

Climbing rarely sub-erect shrubs. *Leaves* cordate to lanceolate, pubescent or silky. *Flowers* axillary, usually in many-flowered cymes, often sub-capitate; bracts often conspicuous. *Sepals* 5, herbaceous in flower; in fruit leathery but little enlarged; often red within. *Corolla* funnel-shaped, rose-purple, tube more or less hirsute externally; limb plicate, shortly 5-lobed. *Stamens* 5, included; anthers oblong, straight. *Disk* annular. *Ovary* 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a hard dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 30, in the tropics of the Old World chiefly, and mostly in S.E. Asia and Polynesia.

ARGYREIA OBTUSIFOLIA, Lour. Flor. Cochinchin. 135. A large climber. *Leaves* elliptic or oblong, acute or obtuse, with or without a sub-mucronate tip, base cuneate or occasionally rounded, upper surface pilose, under surface silky strigose, nerves 9 to 11 pairs, often rather distinct beneath, very oblique even in wide-leaved plants; length 5 in., breadth 1·5 to 3 in.; petiole ·6 to ·8 in., very rarely 1 to 1·5 in. long. *Flowers* axillary; peduncles usually short, ·6 to 1 in., but occasionally 1·5 to 3 in. long; cymes sub-capitate, the pedicels ·1 to ·2 in. long; bracts ovate, ·15 to ·2 in. long, caducous. *Sepals* 5, ovate-obtuse, ·25 in. long, densely silky-strigose externally, sub-patent in fruit, pale red within. *Corolla* 1·5 in. long, tubular-campanulate, densely uniformly hirsute externally. *Capsule* ·4 in. in diam., globose, pericarp chartaceous, pink. *Seeds* finely grey-velvety, hemispheric, ·2 in. in diam. Choisy in DC. Prod. IX. 333. *Convolvulus obtectus*, Wall. Cat. 1416. *Rivea? obtecta*, Choisy, Convolv. Or. 28, and in DC. Prod. IX. 326. *Argyreia Championi*, Benth. Fl. Hongkong, 236. *A. obtecta*, Clarke in Hook. f. Flor. Brit. Ind. IV. 186. *Lettsonia Championi*, Benth. & Hook. f. Gen. Pl. II. 869.

PERAK: *Scortechini* 1384! KEDAH: Langkawi, *Curtis* 2852!—

DISTRIB. Indo-China, from the Andamans and Tenasserim to Cochin China, Hongkong.

The two varieties distinguished in the *Flora of British India* can no longer be maintained in view of the large suites of specimens reported of late years from the Andamans, where the species is exceedingly common.

# 18. LETTSOMIA, Roxb.

Scandent, more or less hirsute or strigose shrubs. *Leaves* cordate rounded or truncate. *Flowers* in axillary, peduncled, corymbose or capitate cymes; bracts conspicuous. *Sepals* 5, orbicular or elliptic; somewhat thickened and coriaceous in fruit. *Corolla* usually pink; tube infundibuliform-campanulate; limb plicate, very shortly 5-lobed. *Stamens* 5, exserted or included; anthers oblong or linear, straight. *Disk* annular or cupular. *Ovary* 2-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 40, in tropical Africa and S.E. Asia.

There is not, as the writer has already explained (*Journ. As. Soc. Beng.* LXIII. 2, 91), any very good reason for retaining *Lettsomia* as a genus apart from *Argyreia*. In *Argyreia* the ovary is completely 4-celled; in *Lettsomia* it is 2-celled, but not infrequently a partial dissepiment of smaller or larger size is to be found at the base of, sometimes half-way up, the cell.

Capsule chartaceous; seeds usually 4, only casually fewer; leaves cordate, softly hairy; cymes capitate; bracts large, elliptic-oblong, sub-persistent .. .. .

1. *L. peguensis*.

Capsule coriaceous or sometimes somewhat fleshy; seeds usually 1, only casually 2:—

Cymes compact; bracts large, persistent:—

Cymes capitate, globose; bracts purple, large, orbicular-obtuse; leaves ovate-lanceolate, sparingly adpressed-hirsute  
Cymes sub-capitate, hardly globose; bracts ovate or ovate-lanceolate, acute; leaves ovate or elliptic, base rounded or shortly cuneate:—

2. *L. sphaerocephala*.

Corolla 2·25 in. long; leaves chartaceous, glabrous and shining above, a few hairs on petiole and midrib beneath .. .. .

3. *L. Maingayi*.

Corolla 1·25 in. long; leaves firmer, glabrous not shining above, hirsute beneath:—

Leaves hirsute, more especially on the nerves, beneath; petioles sparingly hairy .. .. .

4. *L. Ridleyi*.

Leaves densely hirsute beneath throughout; petioles densely hairy .. .. .

4a. *L. Ridleyi*,  
VAR. *velutina*.

Cymes lax; bracts small, rarely with a casual foliaceous bract in a cyme, and usually caducous:—

Sepals narrowly lanceolate, acute, spreading or sub-reflexed in fruit; bracts lanceolate, occasionally one large and leaf-like; leaves elliptic, softly hairy on both surfaces .. .. .

5. *L. adpressa*.

Sepals ovate or orbicular, obtuse or rarely some of them emarginate; bracts minute, usually caducous; leaves glabrous above:—

Sepals irregular, the three outer entire rounded, sparingly hairy, the two inner wider deeply emarginate, all closely embracing the base of the fruit; leaves elliptic shortly acuminate, sparingly adpressed-pubescent beneath .. .. .

6. *L. Curtisii*.

Sepals regular or nearly so, all entire:—

Corolla 1·5 to 1·75 in. long:—

Sepals sub-equal, at length almost glabrous and somewhat spreading in fruit; leaves elliptic-oblong, chartaceous, glabrous or very sparingly pubescent beneath .. .. .

7. *L. penangiana*.

Sepals persistently adpressed grey-pubescent outside, the inner rather larger than the outer, closely embracing the base of the fruit; leaves ovate-acute, firm, sparsely hirsute with rusty hairs beneath ..

8. *L. Scortechinii*.

Corolla ·5 to ·75 in. long; leaves elliptic acuminate; sepals closely embracing the base of the fruit:—

Leaves densely tawny-tomentose beneath; sepals all softly tawny-velvety, the inner rather the smaller; corolla ·75 in. long .. .. .

9. *L. rubicunda*.

Leaves sparingly strigose-hirsute beneath; sepals sub-equal, the outer pubescent, the inner at length almost glabrous .. .. .

10. *L. Kunstleri*.

1. *LETTSOMIA PEGUENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 193. A large climber, sometimes 50 feet long, with villous stems and branches. *Leaves* ovate, ovate-lanceolate or sub-orbicular, apex acute, base cordate; both surfaces densely softly hairy, tomentum fulvous but not acicular; length 4 to 6 in., width 1·5 to 3·5, rarely 5 to 6 in.; petiole 1·5 to 4 in. long. *Flowers* in axillary capitate cymes; peduncles 5 to 9 in. long; bracts sub-persistent, densely softly hairy, elliptic-oblong, 1 in. long. *Sepals* 5, the outer elliptic acute, rather larger than the inner lanceolate, densely hispid; ·5 to ·7 in. long. *Corolla* infundibuliform-campanulate, softly sparsely hairy externally, 2 in. long; limb and upper two-thirds of tube bright pink, base of tube nearly or quite white. *Berry* when ripe glossy brown, sub-globose, thin-walled, ·25 in. across. *Seeds* usually 2 or 4. Prain Journ. As. Soc. Beng. LXIII. 2, 94. *L. strigosa*, Roxb. Hort. Beng. 13, ex Wall. Cat. sub. n. 1404. *L. capitata*, Miq. Flor. Ind. Bat. II. 591. *Argyreia capitata*, Choisy in DC. Prod. IX. 332, partly and excluding var.  $\beta$ . *conferta*: Kurz For. Flor. Burm. II. 216 mainly. *Convolvulus strigosus*, Wall. Cat. 1365/2, 1365/c, and 1365/e partly. *C. barbiger*, Wall. Cat. 1404/1, 1404/2 in part. *Argyreia barbiger*, Choisy Convolv. Or. 42, and in DC. Prod. IX. 332.



PERAK: Batu Kuran, *Scortechini* 1628! near Goping, *King's Collector* 1077! Larut, *King's Collector* 2622! near Ulu Kerling, *King's Collector* 8627! PENANG: Bateh Pulo, *Deschamps*! SELANGOR: Woods at Gua Batu, *Ridley* 8210! 8227! 10194!—DISTRIB. Burma, Tenasserim, Sumatra, Java.

Probably only a geographical form of *Lettsomia strigosa*, Roxb., which is widespread in Indo-China and extends to S. China.

2. LETTSOMIA SPHÆROCEPHALA, Prain Journ. As. Soc. Beng. LXXIII. 2, 19. A shrubby climber; branches irregularly angled, with ridged bark brownish on young shoots, pale straw-coloured on older twigs, sparingly beset with adpressed acicular hairs. *Leaves* ovate-lanceolate, apex acute, base rounded, purplish beneath, very sparingly beset on both surfaces with adpressed hairs; length 4 to 5 in., width 1·5 to 2 in.; petiole 1 to 1·25 in., sparsely pubescent above with adpressed hairs. *Flowers* in compact capitate globose cymes 1·5 to 2 in. across, on long slender peduncles 2 to 12 in. long, sparingly adpressed-pubescent, surrounded by large orbicular purple involucre sessile bracts 1·5 in. across, sparsely hirsute externally, quite glabrous internally, the individual flowers enveloped in similar but smaller sub-orbicular to spatulate bracteoles ·5 in. long, ·25 to ·5 in. wide; pedicels short adpressed-setose. *Sepals* glabrous externally except at their setose apices, the outer sub-acute, the inner wider obtuse ·25 in. long. *Corolla* ·75 to 1 in. long, infundibuliform-campanulate, pink, softly adpressed-hirsute externally. *Berry* not seen. *Argyreia sphærocephala*, Prain MSS.

PERAK: Krian, Abu Salama, Gunong Haran Ryah, *Scortechini*!

A very striking and remarkable species. The corollas do not appear to be full-sized. *Scortechini*, on the ticket of his Gunong Haran Ryah specimens, has written "fruit from Maxwell's Hill," but unfortunately the fruiting specimens alluded to are not at Calcutta.

3. LETTSOMIA MAINGAYI, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. A large slender climber; branches slender or stoutish, with spreading setulose hairs. *Leaves* ovate or elliptic, base rounded or very shortly cuneate, apex acute or shortly caudate-acuminate, papery, glabrous and shining on both surfaces except for a few hairs on the midrib beneath; length 5 to 7 in., width 3 to 4 in.; lateral nerves 5 to 7; petioles ·5 to 1 in. long, very sparsely setulose. *Flowers* in axillary few-flowered cymes 2 to 3 in. wide; peduncles ·25 to 2 in. long, rather closely hirsute with tawny spreading hairs; bracts ovate-lanceolate, 1·5 in. long, ·6 in. wide, rather strongly parallel-nerved, sparingly hirsute externally, glabrous and dark purple within; bracteoles similar but smaller, ·3 in. long. *Sepals* linear-lanceolate, long-acuminate, ·75 in.

long, beset with long setulose hairs. *Corolla* tubular-campanulate, purple with whitish folds, 2·25 in. long; hairy externally. *Stamens* with filaments glandular-hairy at the thickened base. *Berry* ellipsoid, succulent, ·75 in. long, ·5 in. wide. *Seed* solitary.

MALACCA: *Griffith*, *Maingay*, *Derry* 318! *Goodenough* 1432! PERAK: *Scortechini* 297!

A very distinct species. There is no fruiting specimen in Herb. Calcutta; the above description of the berry is taken from the *Flora of British India*.

4. LETTSOMIA RIDLEYI, Prain Journ. As. Soc. Beng. LXIII. 2, 98. A large climber; branches sparingly hirsute. *Leaves* elliptic-acuminate, quite glabrous above, hirsute especially on the nerves beneath; 5·5 in. long, 3·5 in. wide; petiole 1 to 3 in. long, sparsely hirsute. *Flowers* in compact sub-capitate 8–10-flowered cymes 1·5 in. across, surrounded by large ovate-acute sessile foliaceous persistent bracts hirsute below, quite glabrous above, ·8 in. long, ·25 in. wide; bracteoles similar but smaller, ·3 in. long; peduncles 2 to 6 in. long, hirsute. *Sepals* sub-equal, ovate-lanceolate, externally pubescent, ·3 in. long. *Corolla* pink, infundibuliform-campanulate, 1·25 in. long, tube hirsute externally. *Berry* ovoid, ·5 in. long, ·3 in. in diam., the sepals spreading from its base.

JOHORE: Kota Tinggi, *Ridley* 4214! Chin-chin, *Lake & Kelsall*!  
SINGAPORE: Bukit Mandai, *Ridley*!

VAR. *velutina*, Prain l.c. *Leaves* beneath densely hirsute, as are the petioles, pedicels, and bracts externally.

SINGAPORE: Bukit Mandai, *Ridley*!

Nearest to *L. sphærocephala*, but distinguished by the acute bracts and bracteoles, and to *L. Maingayi*, from which it differs by the smaller flowers and shorter bracts and sepals. VAR. *velutina* in foliage and tomentum remarkably resembles *L. rubicunda*, but the acute sepals and large persistent bracts and bracteoles amply distinguish it.

5. LETTSOMIA ADPRESSA, Miq. Flor. Ind. Bat. II. 591. A scandent shrub; branches hirsute; stems 10 to 30 feet long. *Leaves* elliptic, softly hirsute on both surfaces; base rounded or cuneate, apex acute; length 4 to 5 in.; width 2 to 2·5 in.; petiole 1·5 in. long, softly hirsute. *Flowers* in axillary few-flowered, somewhat open cymes 2 in. across; peduncles ·5 to 1·5 in. long, hirsute; bracts lanceolate, hirsute, ·3 in. long, ·15 in. wide, with an occasional longer leaf-like bract; bracteoles small. *Sepals* ·3 to ·5 in. long, narrowly lanceolate, sparingly hirsute, spreading or sub-reflexed in fruit. *Corolla* tubular-campanulate, dull claret, or pale pink and white, or white with claret stripes, externally hairy; tube 1·25 in. long. *Berry* ellipsoid, ·5 in. long, ·3 in. wide, at first green with a reddish tint, becoming bright pink, and at length, when quite ripe, reddish-brown. Clarke in Hook. f. Flor. Brit. Ind. IV. 196.

*Convolvulus adpressus*, Wall. Cat. 1424. *Moorcroftia adpressa*, Choisy Convolv. Or. 49, and in DC. Prod. IX. 334.

PENANG: Porter! Kunstler 1324! 5271! Curtis 318! MALACCA: Mainingay! PERAK: Scortechini 1280! King's Collector 2457! 5400! Wray 1914! 3298! 3961!

6. LETTSOMIA CURTISII, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A climber with brown glabrous branches. *Leaves* elliptic, shortly acuminate, glabrous except for a few hairs on the midrib above, sparingly adpressed-hirsute beneath; length 4 to 5 in., width 2·5 to 3 in.; petiole 2 to 3 in. long, glabrous. *Flowers* in axillary compound sub-umbellate cymes, 3 in. wide, 12–16-flowered; peduncles 4 to 10 in. long, brown, glabrous; bracts deciduous. *Sepals* coriaceous, 25 in. long, the three outer sparingly hirsute, rounded, entire, the two inner wider, deeply emarginate, glabrous. *Corolla* not seen. *Berry* ovoid, succulent, 75 in. long, 5 in. wide, lower third closely embraced by the sepals.

SELANGOR: Kwala Lampar, Curtis 2158!

A very distinct species, easily differentiated by its emarginate inner sepals.

7. LETTSOMIA PENANGIANA, Miq. Flor. Ind. Bat. III. 592. A climber with very slender stems sometimes 100 feet long, young branches thin, fulvous-tomentose, soon becoming glabrous. *Leaves* elliptic-oblong, base rounded or cuneate, apex acute or sub-acute, papery, medium green glabrous above, very light green and glabrous or sparingly adpressed-pubescent and more closely hairy on the midrib beneath; 6 in. long, 2·5 in. wide; petiole 5 to 1 in., glabrous. *Flowers* in lax axillary cymes 2 to 3 in. across, the terminal flower usually longer than the others; peduncles slender, 2 to 6 in. long, very sparsely hirsute, soon glabrous; pedicels 3 to 7 in. long, slender, hirsute; bracts minute. *Sepals* ovate-obtuse, sparingly hairy and at length glabrescent, 2 in. long, at length spreading or sub-reflexed. *Corolla* tubular-campanulate, externally hirsute, bright claret or purple within, paler without, 1·5 to 1·75 in. long. *Berry* ovoid, 6 in. long, 3 in. wide, rose-pink, reddish-blue, or purple. Clarke in Hook. f. Flor. Brit. Ind. IV. 196; Prain Journ. As. Soc. Beng. LXIII. 2, 99. *Convolvulus penangianus*, Wall. Cat. 1425. *Moorcroftia penangiana*, Choisy Convolv. Or. 50, t. 4., and in DC. Prod. IX. 335.

PENANG: Porter! Curtis 1586! PERAK: very common; Scortechini 1147! Wray 2061! 2095! 2334! 2733! Curtis 2034! Derry! King's Collector 1936! 2048! 2574! 3223! 5339!

VAR. *reticulata*, Prain Journ. As. Soc. Beng. LXIII. 2, 100. Leaves thicker, secondary nerves beneath very distinct.

PERAK: Larut, *King's Collector* 8544!

The leaves of this species are very characteristically glandular-punctate beneath. The peduncles and pedicels of *var. reticulata* are rather shorter than in the type and the corolla, described by Kunstler as "waxy white, pale blue inside," is only two-thirds the length and only half the width of that of *L. penangiana* proper. But the leaves have the same characteristic glandular punctulation and are similarly sparingly adpressed-pubescent beneath, while the fruit, described by Kunstler as a rich pink, is indistinguishable from that of *L. penangiana*. This form, therefore, though very distinct, cannot yet be more than varietally separated.

8. *LETTSOMIA SCORTECHINII*, Prain Journ. As. Soc. Beng. LXIII. 2, 98. A strong climber; stems rusty-brown, very sparingly pubescent. *Leaves* ovate-acute, base rounded, firmly sub-coriaceous, very sparsely hirsute with scattered rusty hairs beneath, glabrous above; length 2 to 3 in., width 1 to 2 in.; petiole .5 to 1 in., minutely sparingly rusty-pubescent. *Flowers* in open 3-8-flowered corymbose cymes 1 to 1.5 in. across; peduncles minutely sparingly rusty-pubescent, 2 to 5 in. long; bracts caducous. *Sepals* orbicular, minutely adpressed-grey-tomentose externally, in flower .25 in., in fruit .3 in. across, the inner larger than the outer. *Corolla* 1.5 in. long, infundibuliform-campanulate, pink, densely adpressed-fulvous-tomentose on tube and bands of limb externally. *Berry* sub-spherical to ellipsoid, .5 in. wide, .5 to .75 in. long, the base closely embraced by the sepals.

PERAK: Canfield's Hill, 4,000 feet, *Scortechini* 381! Birch's Hill, *Ridley* 10681! Maxwell's Hill, *Ridley* 5559!

As in the case of *L. rubicunda*, one or two bracts remain on the specimens; they are small, orbicular, .2 in. across, but it does not follow that the fallen bracts were so small. The corollas on *Scortechini's* specimens, on which the original description was based, are about .6 in. long, but subsequent material communicated by Mr. Ridley (*Ridley* 5559) shows that the flowers originally described were not fully expanded. Another of Mr. Ridley's specimens (10681) proves that the berry is not always sub-spherical. The species is obviously closely allied to *L. rubicunda*, but besides the very different degree of tomentum, *L. Scortechini* differs from *L. rubicunda* in having the inner sepals distinctly larger, instead of smaller, than the outer.

9. *LETTSOMIA RUBICUNDA*, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. An extensive climber; stems fulvous-tomentose. *Leaves* elliptic, shortly abruptly acuminate or acute, base rounded, sub-coriaceous, densely tawny-tomentose beneath, glabrous above; length 5 to 7 in., width 2 to 4 in.; petiole tawny-tomentose, 1 to 2 in. long. *Flowers* in open many-flowered corymbose cymes, 2 to 4 in. across; peduncles tawny-tomentose, 3.5 to 7 in. long; bracts caducous. *Sepals* orbicular, obtuse, softly tawny-velvety, in flower .2 in., in fruit .3 in. across, the inner rather smaller. *Corolla* .75 in. long, infundibuliform-campanulate, pink, densely tawny-tomentose externally. *Berry* ellipsoid, obtuse,

smooth, dry, .75 in. long, .3 to .5 in. wide, the base closely embraced by the sepals. *Convolvulus rubicundus*, Wall. Cat. 1409. *Argyria rubicunda*, Choisy Convolv. Or. 44, and in DC. Prod. IX. 333.

MALACCA: Griffith! Maingay.—DISTRIB. Burma.

The above description is taken from Griffith's Malacca plant; the writer has seen no other specimens. One or two bracts remain; they are small, .2 in. across, and orbicular, but it does not follow that the fallen bracts were so small. There is no perfect corolla on the specimens at Calcutta; the length of the tube given above is derived from Mr. C. B. Clarke's description.

10. LETTSOMIA KUNSTLERI, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A slender climber, 50 to 80 feet long, young branches densely hirsute. *Leaves* elliptic-acuminate, glabrous and shining above, sparingly strigose-hirsute beneath, especially on the nerves, occasionally the midrib above sparsely hairy; length 3.5 to 4.5 in., width 2 to 2.5 in.; petioles densely hirsute, 1 to 1.5 in. long. *Flowers* in lax axillary 12–20-flowered cymes, 2 to 3 in. across; peduncles 5 to 8 in. long, densely hirsute; bracts hirsute, 3 in. wide; pedicels hirsute, slender, .5 to .75 in. long. *Sepals* orbicular, sub-equal, the three outer pubescent, the others at length almost glabrous, .15 in. long. *Corolla* white externally, bright pink or red within, externally hirsute, tubular-campanulate, .5 in. long. *Berry* ovoid, .5 in. long, .3 in. wide, deep glossy red.

PERAK: Larut; Kota, Wray 2856! Ulu Salama, *Scortechini!* Goping, Chanderiang, &c., *King's Collector*, 732! 2307! 2726! 5672! Campon Road, *Ridley* 9704! SELANGOR: Batu Caves, *Ridley* 8220!—DISTRIB. Sumatra.

## Order LXXXII. SOLANACEÆ.

[By D. PRAIN.]

Herbs or shrubs, sometimes becoming small soft-wooded trees. *Leaves* alternate or at times in unequal pairs, rarely clustered, never truly opposite, entire, lobed or pinnate; stipules 0. *Inflorescence* of terminal or oftener lateral axillary or extra-axillary cymes, or of solitary or clustered pedicels, without bracts or bracteoles. *Flowers* regular, hermaphrodite. *Calyx* inferior, gamosepalous, lobes or teeth usually 5, rare 4 or 6 to 10; usually persistent, sometimes enlarged in fruit. *Corolla* gamosepalous 5-lobed or rarely (*Datura*) 10-lobed or with limb sub-entire; narrow-campanulate to rotate. *Stamens* 5, epipetalous; anthers oblong or narrow-ovate; cells parallel, dehiscing by apical pores or longitudinally. *Ovary* 2-celled or imperfectly

1-celled by abortion, or 4-celled by subsequent development of accessory dissepiments; style linear; stigma capitate or shortly lobed; ovules indefinite, on peltate intruded placentas. *Fruit* indehiscent, berry-like or capsular and opening by valvular or circumscissile dehiscence; usually 2-celled, rarely 4-celled, many-seeded. *Seeds* compressed, disc-like or sub-reniform with embryo peripheric; occasionally (*Nicotiana*) hardly compressed and with embryo straight.—**DISTRIB.** Species about 1,300, throughout tropical and sub-tropical countries.

Fruits berry-like, 2-celled, indehiscent; seeds compressed and embedded in pulp:—

Anthers opening by 2 small pores at the tips; fruits globular (in *S. Melongena* sometimes elongated) .. .. 1. SOLANUM.

Anthers dehiscing throughout longitudinally:—

Calyx in fruit small, fruits usually elongated .. .. 2. CAPSICUM.

Calyx in fruit enlarging and enveloping the globose berry .. .. 3. PHYSALIS.

Fruits capsular:—

Capsules 4-celled and 4-valved, or sometimes hardly dehiscing; seeds compressed; flowers solitary .. .. 4. DATURA.

Capsules 2-celled, dehiscing freely; seeds hardly compressed; flowers in panicles .. .. 5. NICOTIANA.

### 1. SOLANUM, Linn.

Armed or unarmed herbs, shrubs, or small trees. *Leaves* alternate or sub-opposed in unequal pairs, entire, lobed or pinnatifid. *Cymes* dichotomous or racemose, lateral or terminal. *Calyx* usually 5-lobed, rarely 10-lobed or sub-entire, sometimes enlarging in fruit. *Corolla-tube* short, rotate or very shortly campanulate; limb 5-lobed, plicate in bud. *Stamens* 5, with short filaments, adnate to throat of corolla; anthers oblong, narrowed upwards so that the two cells form a cone opening at the tip by terminal pores. *Ovary* 2-celled (in cultivated forms sometimes 3–4-celled); style columnar, stigma small. *Fruit* berry-like but with calyx at base, rarely overtopping it, globose or (rarely) elongated. *Seeds* very numerous, disk-like; embryo peripheric.—**DISTRIB.** Species 750, mostly tropical American, but spread throughout all tropical and sub-tropical regions.

Unarmed herbs or shrubs:—

Flowers in extra-axillary peduncled cymes or racemes:—

Leaves glabrous or sparingly pubescent; cymes sub-umbellate; calyx-teeth obtuse, 5; corolla and ovary glabrous; berry red or black, rarely yellow .. .. 1. *S. nigrum*.

Leaves densely stellately woolly; cymes corymbose; calyx-teeth triangular, 5; corolla and ovary hairy; berry yellow .. .. 2. *S. verbascifolium*.

Flowers axillary, pedicels fascicled or solitary; corolla glabrous:—

- Calyx with a sub-entire margin; flowers white; leaves glabrous; epiphytic .. .. 3. *S. parasiticum*.
- Calyx with a distinctly 10-toothed margin; terrestrial:—  
 Leaves glabrous; calyx with 5 long teeth and 5 very short intermediate toothlets; corolla-lobes purplish; berry dark blue .. .. 4. *S. Blumei*.  
 Leaves usually puberulous to pubescent, rarely almost glabrous; calyx with 10 long teeth; corolla white; berry yellow .. .. 5. *S. biflorum*.
- Armed herbs with prickly stems and usually prickly leaves; corolla pubescent externally:—  
 Densely stellate-tomentose throughout:—  
 Calyx not overtopping the berry; erect herbs or shrubs:—  
 Flowers white:—  
 Leaves very prickly especially on the nerves beneath; ovary hirsute; fruit hispid with acicular hairs .. 6. *S. ferox*.  
 Leaves with very few prickles; ovary and fruit glabrous .. .. 7. *S. torvum*.  
 Flowers blue:—  
 Racemes many-flowered; berry small, yellow, globose .. 8. *S. indicum*.  
 Racemes few-flowered; berry large, purple, rarely white or yellow, often in cultivation ellipsoid or elongate .. 9. *S. Melongena*.  
 Calyx overtopping the berry; a spreading shrub .. 10. *S. sarmentosum*.  
 Thinly beset with minute hairs; berry large, smooth; calyx very prickly .. .. 11. *S. aculeatissimum*.

1. *SOLANUM NIGRUM*, Linn. Sp. Pl. 186. A herb or undershrub, 1 to 3 feet high; all parts sparingly pubescent or glabrous. *Leaves* petioled, membranous, ovate or oblong, narrowed towards apex and base, sinuate-toothed or -lobed; 3 to 4 in. long, 2 in. across; green on both surfaces; petioles .75 in. long. *Flowers* small, sub-umbellately clustered on stoutish extra-axillary peduncles .35 to .75 in. long; pedicels 5 to 8 together, slender, .35 in. long. *Calyx* sparsely puberulous, 5-toothed; teeth small, ovate-oblong, .05 in. long, in fruit hardly noticeable. *Corolla* white, rarely purplish, externally glabrous, .5 in. wide, rotate, 5-lobed. *Ovary* glabrous; style hairy at base. *Fruit* red or black, rarely yellow, globose, .25 in. across, supported by the saucer-shaped calyx. *Seeds* .05 in. in diam., almost smooth. Bl. Bijdr. 694; Dun. in DC. Prod. XIII. 150; Miq. Flor. Ind. Bat. II. 636; Kurz For. Flor. Burm. II. 224; Clarke in Hook. f. Fl. Br. Ind. IV. 229. *S. rubrum*, Roxb. Flor. Ind. I. 565. *S. triangulare*, Lamk III. II. 18. *S. uliginosum*, Bl. Bijdr. 695. *S. Rumphii*, Dun. in DC. Prod. XIII. 57. *S. rhinocerotis*, Bl. Bijdr. 695.

SINGAPORE: Ridley 8084! PERAK: Kota Bahru, King's Collector 566! ANDAMANS: King's Collectors! NICOBARS: Kurz!—DISTRIB. Tropics generally.

2. *SOLANUM VERBASCIFOLIUM*, Linn. Sp. Pl. 184. An erect unarmed shrub, 8 to 20 feet high; all parts thickly stellate-tomentose, the

tomentum often scurfy. *Leaves* petioled, thickly herbaceous, ovate-lanceolate to lanceolate, acute; base usually truncate or rounded, rarely cuneate; 4 to 7 in. long, 3 in. across; green above, white to yellowish-brown beneath from the scurfy tomentum; petioles .5 to 1.5 in. long. *Flowers* small, on thick tomentose pedicels, densely clustered in a small tomentose corymb-like cyme on an erect sub-terminal stout peduncle 1 to 3 in. long. *Calyx* densely tomentose, 5-toothed; teeth triangular, acute, .1 in. long in flower. .3 in. long in fruit; tube short. *Corolla* white, externally stellate-tomentose, .6 in. across, rotate, 5-lobed; lobes short, ovate-oblong. *Ovary* hairy; style glabrous. *Fruit* yellow, globose, .4 in. wide, the lower portion embraced by the calyx-lobes. *Seeds* .12 in. in diam., minutely dotted. Dun. in DC. Prod. XIII. 114; Lour. Flor. Cochin-Chin. 128; Wall. Cat. 2616; Kurz For. Flor. II. 225; Clarke in Hook. f. Flor. Brit. Ind. IV. 230; Miq. Flor. Ind. Bat. II. 640. *S. pubescens*, Bl. Bijdr. 698; Roxb. Flor. Ind. ed. Carey & Wall. II. 244 (not of Willd.).

SELANGOR: Kwala Lampar, *Goodenough!* PERAK: *King's Collector* 2069! 7177! *Wray* 2357! PENANG: *Deschamps!* KEDAH: *King's Collector* 1704! NICOBARS: Kamorta, *Jelinek!* Teressa, *King's Collectors!*—DISTRIB. Tropics of both hemispheres.

3. *SOLANUM PARASITICUM*, Bl. Bijdr. 697. An erect almost glabrous epiphytic shrub, 2 to 4 feet high. *Leaves* short-petioled, rather firmly membranous, lanceolate-acuminate, narrowed towards apex and base, entire; 6 to 8 in. long, 1.5 to 2 in. wide; green on both surfaces, minutely setulose above when young, glabrous beneath; petiole .25 to .35 in. long. *Flowers* small, clustered in an axillary fascicle of 2 to 7 together or sometimes solitary, on slender somewhat rigid glabrous pedicels .6 to .8 in. long. *Calyx* glabrous, small, the margin in flower sinuate representing either 5 or 10 teeth at most only .1 in. long; in fruit slightly enlarged, saucer-shaped, the margin quite entire. *Corolla* white, glabrous externally, 5-lobed, rotate; .25 in. across. *Ovary* and style glabrous. *Fruit* yellow, globose, .25 in. in diam., resting on the saucer-shaped calyx. *Seeds* .06 in. in diam., smooth. Nees Trans. Linn. Soc. XVII. 45; Miq. Flor. Ind. Bat. II. 641.

PERAK: Larut, on trees, rather plentiful, *Wray!* *Scortechini!* *King's Collector!*—DISTRIB. Sumatra, Java.

Near *S. subtruncatum* but always epiphytic, and with an even more markedly truncate calyx-limb than in that species.

4. *SOLANUM BLUMEI* Nees ex Bl. in Bijdr. 696. An erect quite glabrous shrub, 3 to 4 feet high, with spreading branches. *Leaves* towards top in pairs from one node, usually one smaller, elliptic-acuminate at both ends, bases unequal; 4 to 6 in. long, 2 to 3 in. wide;



rather firmly membranous; lateral nerves 6 to 7 pairs; petiole .3 in. long. *Flowers* in clusters of 2 to 9, rarely solitary, axillary; pedicels slender, in flower deflexed, in fruit spreading, .75 in. long, thickened upwards. *Calyx* glabrous, limb sub-truncate with 5 subulate, and 5 intervening minute teeth, the longer series .2 to .25 in. long. *Corolla* with white tube and 5 purplish narrow-ovate lobes, .3 in. across. *Ovary* and style glabrous. *Fruit* globose, dark blue, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .09 in. in diam., almost smooth. Nees Trans. Linn. Soc. XVII. 45; Dun. in DC. Prod. XIII. 180; Miq. Flor. Ind. Bat. II. 642.

SELANGOR: *Ridley*! PERAK: Larut, *King's Collector*! Wray! Curtis! *Ridley*! *Scortechini*! Gunong Panti, *Kunstler*!—DISTRIB. Sumatra, Java, Borneo.

The commonest *Solanum* of its group in our area. It has been suggested by Clarke that there is little to separate this form specifically from *S. subtruncatum*; this is true, but there seems equally little to separate it specifically from *S. biflorum*. Its glabrous condition, however, at once distinguishes it from both as, if not a species, at least a very marked form.

5. *SOLANUM BIFLORUM*, Lour. Flor. Cochinchina. 129. An erect more or less pubescent shrub, 3 to 6 feet high; the young shoots often flocculose. *Leaves* membranous, elliptic or oblong, acuminate, base narrow-cuneate, entire; 3 to 5 in. long, 1.5 to 1.75 in. wide; green on both sides, setulose-pubescent, rarely glabrescent with age; petiole .7 in. long. *Flowers* small, clustered in axillary fascicles of 2 to 6 together, or solitary; pedicels slender, .65 in. long. *Calyx* setulose-pubescent, the margin usually 10-toothed rarely 7-9-toothed; teeth narrowly lanceolate, setulose, .15 in. long. *Corolla* white, externally glabrous, rotate, 5-lobed, .25 in. across. *Ovary* and style glabrous. *Fruit* globose, yellow, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .1 in. in diam., almost smooth. Dun. in DC. Prod. XIII. 178; Kurz For. Flor. Burm. II. 224; Clarke in Hook f. Flor. Brit. Ind. IV. 232. *S. decemdentatum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 565; Wall. Cat. 2614; Miq. Flor. Ind. Bat. II. 643. *S. mollissimum*, Bl. Bijdr. 698. *S. decemfidum*, Nees Trans. Linn. Soc. XVII. 43. *S. Zollingeri*, Dun. in DC. Prod. XIII. 176.

MALACCA: *Griffith*! SINGAPORE: *Wallich* (*fide* Clarke).—DISTRIB. Throughout Indo-China and the Malay Archipelago.

Though so plentiful in the countries both south and north of the Malay Peninsula, this seems very rare in our area where *S. Blumei* appears to replace it.

6. *SOLANUM FEROX*, Linn. Sp. Pl. ed. II. 267. An erect prickly shrub, 3 to 10 feet high, with a short soft-wooded trunk 2 to 3 in. thick;

all the younger parts thickly covered with a brownish soft tomentum intermixed with many sharp compressed brownish prickles of unequal size. *Leaves* usually sub-opposite, membranous, ovate to nearly orbicular with irregular short triangular acute or blunt lobes; 5 to 9 in. long, 3 to 6 in. wide, the lobes often 1 in. deep; green above, brownish from the tawny tomentum beneath, sparingly beset on midrib and nerves with long compressed prickles; petioles .5 to 2.5 in. long, prickly. *Flowers* large, on thickish pedicels clustered in few-flowered sub-umbellate short-peduncled racemes set close below the leaves; peduncles and pedicels densely stellate-tomentose and beset with long acicular hairs. *Calyx* shortly funnel-shaped, densely hirsute, sometimes prickly; lobes ovate-acute, .25 in. long. *Corolla* white, densely tomentose externally, nearly 1 in. across; lobes oblong-acute. *Ovary* hairy. *Fruit* yellow, globose, 1 in. in diam., hispid with acicular hairs, much exceeding the hardly altered calyx. *Seeds* .12 in. in diam., very slightly scrobiculate. Dun. in DC. Prod. XIII. 255; Kurz For. Fl. Burm. II. 226 (excl. var.  $\beta$ ); Miq. Flor. Ind. Bat. II. 646; Clarke in Hook. f. Flor. Brit. Ind. IV. 233. *S. lasiocarpum*, Bl. Bijdr. 701; Wall. Cat. 2623; Dun. in DC. Prod. XIII. 252. *S. hirsutum*, Roxb. Hort. Beng. 17, and Fl. Ind. ed. Carey & Wall. II. 253. *S. stramonifolium*, Dun. in DC. Prod. XIII. 252 (not of Jacq., nor of Wall., nor of Roxb.).

PENANG: Wallich! PERAK: Sungah Ryah, *Kunstler* 1022! Gunong Mesah, *King's Collector* 1026! SINGAPORE: Wallich! ANDAMANS: Port Blair, plentiful. NICOBARS: Nancowry, *King's Collector*!—DISTRIB. India, Indo-China, S. China, Sumatra, Java.

7. *SOLANUM TORVUM*, Sw. Prod. Veg. Ind. Occ. 47. An erect sparingly armed shrubby perennial, 3 to 6, or at times even 8 to 12 feet high; all parts shortly and sparsely stellate-pubescent, with but few compressed sharp scattered prickles. *Leaves* usually sub-opposite, membranous, ovate, shortly acuminate, sinuate or lobed, the lobes obtuse or acute, the base truncate very unequal; 2 to 4 in. long, 1.5 to 3 in. across; rather sparingly pubescent above, more closely sometimes scurfily pubescent beneath; petioles .5 to 1 in. long. *Flowers* medium, in lateral usually extra-axillary corymbose cymes with short pubescent peduncles; pedicels slender, .3 to .4 in. long, pubescent. *Calyx* sparsely pubescent, 5-toothed, .25 in. long, without prickles, the teeth ovate-lanceolate acute, .1 in. long, not enlarging in fruit. *Corolla* white, externally stellate-pubescent, .5 in. across, rotate, 5-lobed, the lobes .3 in. long, lanceolate-acuminate. *Ovary* glabrous. *Fruit* yellow, supported by the calyx which becomes glabrous in fruit, globular, .4 in. across. *Seeds* .2 in. in diam., compressed, minutely granular. Dun. in DC. Prod. XIII. 260; Wight Ic. t. 345; Miq. Flor. Ind. Bat. II.

648; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. stramonifolium*, Roxb. Flor. Ind. I. 572.

PENANG: Wallich! Deschamps! Ridley! MALACCA: Griffith! PERAK: King's Collector 1085! Scortechini 60! SINGAPORE: Schomburgk! Hullett! Kunstler 99! Ridley! ANDAMANS: very common.—DISTRIB. Malayan Archipelago, Indo-China, Philippines, China, India, Tropical America.

This is often exceedingly like the next species, *S. indicum*, but is easily distinguished by its white flowers and its considerably larger fruits.

8. SOLANUM INDICUM, Linn. Sp. Pl. 187 partly; Nees in Trans. Linn. Soc. XVII. 55. An erect, armed, branching shrub, 4 to 8 feet high; all young parts thickly covered with a short stellate tomentum, with broad, compressed, sharp, slightly recurved prickles. *Leaves* membranous or thinly herbaceous, ovate, sinuately lobed, the lobes obtuse or acute, the base obliquely truncate; 1·5 to 3 in. long, 1 to 2 in. wide; above minutely tomentose, green; grey from the denser tomentum beneath; petioles ·5 to 1 in. long. *Flowers* medium, in lateral or spuriously terminal racemes about 2·5 to 3 in. long; pedicels ·2 to ·3 in. long, sometimes prickly and grey stellate-pubescent, as are the peduncles. *Calyx* grey stellate-pubescent, 5-toothed, ·25 in. long, prickly or not; the teeth lanceolate-acute, hardly enlarging in fruit. *Corolla* blue, externally stellate-pubescent, ·5 in. across, rotate, 5-lobed, the lobes ·35 in. long. *Ovary* glabrous. *Fruit* yellow or orange, small, supported by the hardly altered calyx, globose, ·25 in. in diam. *Seeds* ·15 in. in diam., minutely dotted. Lour. Flor. Cochinchina. 131; Roxb. Flor. Ind. I. 570; Wall. Cat. 2626; Wight, Ic. t. 346; Dun. in DC. Prod. XIII. 309; Miq. Flor. Ind. Bat. II. 651; Kurz For. Fl. Burm. II. 226; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. violaceum*, Jacq. Fragm. 82, t. 133, f. 1 (not of R. Br.). *S. cuneatum*, Moench Meth. n. 476; Poir. Suppl. III. 743. *S. canescens*, Bl. Bijdr. 701. *S. Junghuhnii*, Miq. Flor. Ind. Bat. II. 649.

PENANG: Wallich! SELANGOR: King's Collector 363! PERAK: Wray 3077! ANDAMANS: Prain!—DISTRIB. Throughout S.E. Asia.

This species often is very like *S. torvum*; it is readily distinguished by its usually, though not invariably, more numerous prickles, by its blue flowers, and its smaller fruits.

9. SOLANUM MELONGENA, Linn. Sp. Pl. 186. A stout erect, sparingly armed herb, 2 to 8 feet high; all the younger parts covered with a grey soft tomentum. *Leaves* membranous, ovate or oblong, irregularly sinuately lobed; 3 to 6 in. long, 2 to 4 in. wide; green above, stellately pubescent beneath with a few prickles on the nerves or sometimes

quite unarmed; petiole 1 in. long. *Flowers* large, on extra-axillary often paired peduncles, one peduncle with a solitary perfect flower the other with a few-flowered raceme of male flowers; peduncles stellate-tomentose, very rarely prickly. *Calyx* shortly funnel-shaped, densely pubescent; lobes oblong-acute; .25 to .35 in. long, enlarging slightly in fruit, usually armed. *Corolla* blue, externally pubescent, 1 to 1.25 in. across, 5-lobed, lobes oblong-acute, short. *Ovary* glabrous; style stellate-pubescent or at times glabrous. *Fruit* large, ovoid, obovoid, ellipsoid, or cylindric; usually dark purple, often with white spots or streaks, sometimes uniformly white or yellowish, always glabrous, sometimes as much as 6 in. long and always much longer than the calyx. *Seeds* .12 in. in diam., slightly scrobiculate. Lour. Flor. Cochinchin. 130; Roxb. Flor. Ind. I. 566; Miq. Flor. Ind. Bat. II. 653; Clarke in Hook. f. Flor. Brit. Ind. IV. 235. *S. insanum*, Roxb. Flor. Ind. I. 568. *S. undatum*, Lamk Encyc. IV. 301; Bl. Bijdr. 700. *S. longum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 567. *S. pseudo-undatum*, Bl. Bijdr. 699. *S. ovigerum*, Bl. Bijdr. 698. *S. Trongum*, Lamk Encyc. IV. 308. *S. ferox* var. *Trongum*, Kurz For. Flor. Burm. II. 226.

In all the provinces, cultivated; occasionally also as an escape from cultivation or sub-feral (e.g., at Trang, King's Collector 1416!)

The Egg-Plant, or Brinjal, largely cultivated in all warm countries; originally American. As an escape this species tends to become more prickly and to have 3 to 4 fruits on the peduncle, owing to the males being replaced by perfect flowers. In such cases the fruits are much smaller and often approach, or sometimes even attain a globose form.

10. SOLANUM SARMENTOSUM, Nees Trans. Linn. Soc. XVII. 58. A straggling prickly shrub with procumbent zigzag branches, 2 to 3 feet long; all parts sparsely hairy and covered with long, straight, sharp prickles. *Leaves* membranous, broadly elliptic, sub-pinnatifid, lobes obtuse, sub-glabrescent above, sparsely stellately pubescent and prickly beneath; 4 in. long, 2 in. across, the lobes .75 in. deep; green on both surfaces; petioles .6 in. long. *Flowers* large, with thickish pedicels on 1-2-flowered, extra-axillary peduncles about 1 in. long, sparsely stellate-pubescent. *Calyx* with very shortly funnel-shaped tube, lobes ovate-acuminate .2 in. long, sparsely hairy and prickly, much enlarged in fruit. *Corolla* blue, externally pubescent, .7 in. across; lobes oblong-acute. *Ovary* glabrous. *Fruit* yellow, globose, glabrous, .5 in. across, overtopped by the enlarged caudate-acuminate, adpressed, armed calyx-lobes, .75 in. long and .35 in. wide. *Seeds* .12 in. in diam., scrobiculate. Dun. in DC. Prod. XIII. 357; Clarke in Hook. f. Flor. Brit. Ind. IV. 236. *S. Melongena*, Wall. Cat. 2628 (F. only—not of Linn.). *S. Jacquinii*, Miq. Flor. Ind. Bat. II. 651 (not of Willd.).

PENANG: Wallich! PERAK: Scortechini! MALACCA: Griffith.  
PAHANG: Ridley!—DISTRIB. Malay Archipelago.

11. *SOLANUM ACULEATISSIMUM*, Jacq. Col. I. 100. An armed slender undershrub, 2 to 3 feet high, with glabrous stems covered with very many long, straight, slender prickles. *Leaves* only on the upper part of the stems, membranous, ovate, lobed, sparsely hairy; 3 to 5 in. long. *Flowers* on 1-7-flowered peduncles, that are usually only 1-fruited; peduncles in fruit .75 in. long. *Calyx* even in fruit small, under .25 in. long, very prickly. *Fruit* globose, 1.25 in. across, smooth. *Seeds* .2 in. in diam., extremely compressed, almost winged. Jacq. Icon. I. t. 41; Clarke in Hook. f. Flor. Brit. Ind. IV. 237. *S. aculeatissimum* var. ? *denudatum*, Dun. in DC. Prod. XIII. 244.

SINGAPORE: G. Thomson.

This is not in Herb. Calcutta. The above meagre description is taken from the accounts of Dunal in the *Prodromus*, and of Clarke in the *Flora of British India*. The specimen to which Clarke refers is one of the "varieties" of Dunal, not the true *S. aculeatissimum* of Jacquin, and Dunal himself was not satisfied that it is to Jacquin's species of this name that the variety should be referred. As it has not again been reported, it is possible we may have here to deal with an unusual state of some casually introduced and perhaps well-known American species.

## 2. CAPSICUM, Linn.

Unarmed annual or perennial, glabrous or glabrescent herbs or shrubs. *Leaves* alternate, entire or repand. *Flowers* axillary, solitary or several together. *Calyx* campanulate, minutely 5-toothed, not enlarging in fruit. *Corolla-tube* short, rotate, limb 5-lobed, valvate in bud. *Stamens* 5, adnate near base of corolla; anthers oblong, not longer than filaments, dehiscent longitudinally. *Ovary* 2-celled, rarely 3-celled; style columnar, stigma small. *Fruit* resembling a berry, but with the calyx at its base; elongated or (rarely) globose. *Seeds* very numerous, disk-like; embryo peripheric.—DISTRIB. Species 2 or more, natives of America.

The number of species is doubtful, and depends on the point of view of the reviewer with regard to the many more or less distinct forms assumed by the plants under cultivation; some writers recognise as many as 80, others claim only about 20; more recent authors insist only on 2 species—a perennial (*C. frutescens*), and an annual (*C. annuum*), both very variable. Possibly, however, there is but a single very variable species, for in the tropics the forms of *C. annuum* are often not truly annual, and in temperate regions the perennial tropical forms rarely persist for more than a season.

Pedicels solitary, variously erect or reflexed; fruits erect or spreading or pendent, at least as long as, usually longer than, the pedicels; plants annual or biennial:—

Flowers white; berries at first green, afterwards becoming red, orange or yellow:—

Fruit not globular:—



VAR. *acuminata*, Fingerhuth. Fruit much longer than broad, slender, rarely straight, always tapering to an acute or sub-acute apex; flesh thin, keenly pungent; berry enclosed at the base by the cupular calyx; colour red or orange, or yellow. *C. longum*, DC. Hort. Monsp. 86; Fingerhuth, Caps. 23, t. 6, 7; Dun. in DC. Prod. XIII. 424. *C. frutescens*, Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Bl. Bijdr. 704; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Cultivated in most of the provinces.

Some of the forms of this variety seem to have been evolved since the introduction of *Capsicum annum* to the Eastern Hemisphere.

VAR. *abbreviata*, Fingerhuth. Fruit conoid, ovate or oblong, not much longer than broad, apex usually blunt; flesh thin, pungent; berry resting on the saucer-shaped fruiting calyx; colour variable. *C. annum*, Roxb. Flor. Ind. I. 573. *C. frutescens*, Dun. in DC. Prod. I. 413. *Capo Molago*, Rheede Hort. Malab. II. 109, t. 56.

Occasionally cultivated.

VAR. *grossa*, Sendt. Fruit swollen, somewhat angular, prismatic or quadrate or oblate, obtuse, hardly longer than broad; flesh thick, hardly pungent; berry resting on the saucer-shaped fruiting calyx; colour red. *C. grossum*, Linn. Mant. 47; Willd. Sp. Pl. I. 1051; Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Fingerhuth, Caps. 21; Dun. in DC. Prod. XIII. 422; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Occasionally cultivated.

VAR. *cerasiformis*, Mill. Fruit globular, red, flesh thin, very pungent. *C. cerasiforme*, Roxb. Flor. Ind. I. 574. *C. grossum*, VAR. *cerasiformis*, Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Sometimes grown in gardens by European residents.

VAR. *nigra*. Fruit much longer than broad; flesh thin, only slightly pungent; calyx hardly enclosing base of fruit; berry at first dark purple, at length becoming orange-red. *C. purpureum*, Roxb. Flor. Ind. IV. 239.

Occasionally cultivated.

2. *CAPSICUM FRUTESCENS*, Linn. Sp. Pl. 189. An erect, much-branching undershrub, 2 to 4 feet high, branches angled, the smaller ones puberulous but soon, like the leaves, becoming quite glabrous. *Leaves* petioled, membranous, ovate-acute, the base short-cuneate, truncate or rarely sub-cordate, the margins entire; lamina usually 2.5 to 4 in. long, 1.5 in. wide, green on both surfaces; petiole .5 to .75 in. long. *Flowers* small, white or yellowish-white; pedicels usually 2 to 3, sometimes 4 or more together in leaf-axils, never all of the same age, drooping in

flower and erect, thickened, rigid and somewhat elongated in fruit, 1 to 1.25 in. long. *Calyx* glabrous; limb truncate with 5 shortly projecting, spreading teeth .12 in. in diam. *Corolla* .2 in. in diam., rotate, 5-toothed. *Ovary* glabrous. *Fruit* erect, narrow to globose, bright red, .2 to .25 in. in diam. Irish Miss. Bot. Gard. Rep. IX. 97.

VAR. *typica*. Fruits ovate or sub-cylindric, acute, .75 in. long, .2 in. in diam. *C. frutescens*, Wall. Cat. 2642 B.C. *C. minimum*, Roxb. Hort. Beng. 17, Flor. Ind. ed. Carey & Wall. II. 261, and ed. propr. I. 574; Wall. Cat. 2641; Blanco, Flor. Filip. 133; Dun. in DC. Prod. XIII. 415; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239. *C. fastigiatum*, Bl. Bijdr. 705; Nees Trans. Linn. Soc. XVII. 64; Dun. in DC. Prod. XIII. 416; Wight Ic. t. 1617; Miq. Flor. Ind. Bat. II. 659; Benth. & Trim. Med. Pl. t. 188.

In all the provinces, cultivated and as an escape.

VAR. *baccata*, Irish l.c. 99. Fruit elliptic-obtuse or globose, .25 to .3 in. long, .25 in. in diam. *Capsicum baccatum*, Linn. Ment. 46; Ham. in Wall. Cat. 2644. *C. angustifolium*, Dun. in DC. Prod. XIII. 420.

NICOBARS: cultivated, *Jelinek* 137! 138!

### 3. *PHYSALIS*, Linn.

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-partite in flower, the tube much enlarged and inflated in fruit, loosely enclosing the berry; teeth small, connivent. *Corolla* campanulate, yellow. *Stamens* 5, attached near base of corolla; anthers oblong, shorter than filaments, dehiscing longitudinally. *Ovary* 2-celled; style columnar; stigma obscurely 2-lobed. *Fruit* berry-like, globose. *Seeds* few or many, disk-like; embryo peripheric.—DISTRIB. Species about 34, mostly tropical American.

*PHYSALIS MINIMA*, Linn. A herbaceous pubescent or glabrescent annual, erect or with procumbent straggling branches, 6 to 15 in. high. *Leaves* petioled, ovate, sinuate angular or hardly lobed; 2 in. long, .75 in. wide, green on both surfaces; petioles 1 in. *Flowers* small, axillary, solitary; pedicels .25 to .5 in. *Calyx* hirsute or glabrescent; in flower .1 to .2 in., with lanceolate lobes as long as tube, in fruit .75 to 1 in., ovoid or sub-globose, 5-10-ribbed, the teeth subconnivent and little altered. *Corolla* yellow, .25 in. across, glabrous, campanulate, 5-toothed. *Ovary* glabrous. *Fruits* yellow, globose, .5 in. across, completely enveloped by the accrescent calyx. *Seeds* very many, .1 in. in diam., discoid, reticulated, hardly scabrous.

VAR. *typica*; calyx not distinctly angled, all parts more or less pubescent. *P. minima*, Linn. Sp. Pl. 183; Nees in Trans. Linn. Soc.



XVII. 69; Roxb. Flor. Ind. I. 563; Dun. in DC. Prod. XIII. 445; Clarke in Hook. f. Flor. Brit. Ind. IV. 238; Miq. Flor. Ind. Bat. II. 604. *P. parviflora*, R. Br. Prod. 447. *P. divaricata*, Don Prod. 97. *P. villosa*, Roth Nov. Sp. 122. *P. Rothiana*, Roem. & Schult. Syst. IV. 677. *P. Hermannii*, Dun. in DC. Prod. XIII. 444.

PERAK: *Scortechini*! MALACCA: *Griffith*! ANDAMANS: common in waste places.—DISTRIB. A cosmopolitan tropical weed.

VAR. *indica*, Clarke Flor. Brit. Ind. IV. 238; calyx distinctly 5-angled, all parts nearly glabrous. *C. indica*, Lamk Encyc. Meth. II. 102; Nees in Trans. Linn. Soc. XVII. 70; Dun. in DC. Prod. XIII. 443; Miq. Flor. Ind. Bat. II. 662. *P. pseudoangulata*, Bl. Bijdr. 706; Miq. Flor. Ind. Bat. II. 663. *P. angulata*, Griff. Notul. IV. 96. *Nicandra indica*, Roem. & Schult. Syst. IV. 632.

PERAK: Kota Bahru, *Kunstler*, 568! Ipoh, *Curtis* 3190! PENANG: *Deschamps*! common. SELANGOR: *Ridley* 10548! NICOBARS: coasts, common.—DISTRIB. India generally.

The Cape Gooseberry, or Winter Cherry (*Physalis peruviana*), is cultivated in European gardens in the cold weather.

#### 4. DATURA, Linn.

Suffruticose, rank-smelling, glabrous or minutely pubescent herbs. *Leaves* large, entire, sinuate or deeply toothed. *Pedicels* solitary, flowers very large, purple or white. *Calyx* long-tubular, herbaceous, apex 5-toothed; in fruit circumscissile above the base. *Corolla* narrowly tubular-funnel-shaped; throat widened, limb plaited, entire or shortly lobed. *Stamens* attached near base of tube, filaments filiform; anthers included, linear, dehiscing longitudinally. *Ovary* 2-celled, or 4-celled by the formation of spurious dissepiments; style filiform; stigma 2-lobed. *Fruit* a capsule, ellipsoid, 4-celled, spinous, more or less completely 4-valved. *Seeds* very many, compressed, rugose; embryo peripheric.—DISTRIB. Species 10, temperate and tropical.

DATURA FASTUOSA, Linn. Syst. ed. X. 932. A coarse annual, 3 to 8 feet high, all parts glabrescent or very faintly puberulous. *Leaves* petioled, membranous, ovate, entire or deeply toothed, glabrous, green; 6 to 8 in. long, 3 to 4 in. across, base unequal; petioles 1 in. *Flowers* very large, solitary, pedicels .25 to .5 in., erect in flower, recurved in fruit. *Calyx* tubular, 2.5 to 3 in. long, .5 in. wide, lobes lanceolate, .25 in. long. *Corolla* purple or white, 7 in. long, base .5, throat 1.5, limb 3 to 5 in. in diam., shortly 5-6-toothed. *Ovary* glabrous. *Capsules* sub-globose, 4-celled, equally spinous on all sides, irregularly dehiscent

near apex, supported by the persistent base of calyx; 1·25 to 1·5 in. in diam. *Seeds* ·25 in. diam.

*VAR. typica*; corolla purple. *D. fastuosa*, Linn. Syst. ed. X. 932; Roxb. Flor. Ind. I. 561; Wall. Cat. 2638; Nees in Trans. Linn. Soc. XVII. 74; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 669; Clarke in Hook. f. Flor. Brit. Ind. IV. 242. *D. Hummatu*, Bernh. in Linn. Litteraturber. (1883) 141.

*VAR. alba*, Clarke in Flor. Brit. Ind. IV. 243; corolla white or cream-coloured. *D. alba*, Nees in Trans. Linn. Soc. XVII. 73; Wight. Ic. t. 852; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 667. *D. Metel*, Roxb. Flor. Ind. I. 561; Wall. Cat. 2639 (*not of* Linn.).

PERAK: Larut, *Scortechini*! Ulu Bubong, *King's Collector*! SINGAPORE: *Hullett*!—DISTRIB. Tropical Africa, S.E. Asia.

The purple-flowered variety has not been sent to Calcutta from any of the provinces. Kunstler says that the white one is "not native" in Perak.

## 5. NICOTIANA, Linn.

Erect, viscid-pubescent herbs, shrubs, or trees. *Leaves* entire or sinuate. *Racemes* paniculate, terminal or sub-terminal. *Calyx* tubular or ovoid, 5-fid. *Corolla* funnel-shaped; lobes 5, induplicate in bud. *Stamens* attached to lower part of corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. *Ovary* 2-celled; style filiform; stigma shortly 2-fid. *Fruit* a capsule, 2-celled, or rarely spuriously almost 4-celled; valves separating to their middle, often again splitting. *Seeds* very many, small, scarcely compressed; embryo nearly straight.—DISTRIB. Species about 35; American, Australian, Polynesian.

NICOTIANA TABACUM, Linn. Sp. Pl. 180. A herb 2 to 3 feet high branching upwards, all parts glandular-pubescent. *Leaves* large, sessile or sub-amplexicaul, ovate-lanceolate, acute, the lower decurrent; 4 to 8 in. (the lower sometimes 12 to 15 in. long) by 2 to 3 in. across; tapering to the cuneate base. *Flowers* large, in compound corymbs with short ultimate bracteate branchlets. *Calyx* campanulate, ·5 in. long, ·3 in. wide, teeth 5, triangular-lanceolate, ·2 in. long. *Corolla* pink or pale-rose, linear-funnel-shaped, 1·75 to 2 in. long, limb 1 in. across, lobes spreading ovate, sub-acuminate. *Capsule* ovate, ·75 in. long, ·5 in. in diam., slightly exceeding calyx. *Seeds* small. Gaertn. Fruct. I. 264, t. 55; Lamk Ill. t. 113; Dun. in DC. Prod. XIII. 557; Miq. Flor. Ind. Bat. II. 670; Clarke in Hook. f. Flor. Brit. Ind. IV. 245.

In all the provinces, cultivated.

A native of America, cultivated in all warm countries. The common Tobacco.

Order LXXXIII. SCROPHULARIACEÆ.

[By D. PRAIN.]

Herbs or shrubs, occasionally epiphytic, sometimes semi-parasitic. *Leaves* all or only the lower opposite, rarely all alternate or whorled, occasionally all radical, sub-rosulate; stipules 0. *Flowers* hermaphrodite, usually irregular; inflorescence centripetal or composite. *Calyx* inferior, 5-, rarely 4-lobed or -partite. *Corolla* hypogynous, more or less 2-lipped or occasionally personate; upper lip entire or 2-lobed, lower 3-lobed. *Stamens* epipetalous, usually 4, didynamous or rarely sub-equal, occasionally only 2, very rarely 5; anthers 2-celled, cells distinct or apically or entirely confluent, or 1-celled by abortion, often when stamens didynamous with anthers connivent and sometimes with their apices connate in a posterior and an anterior pair. *Disk* annular, cupular, or glandular. *Ovary* superior, 2-celled; ovules usually numerous in each cell, anatropous or amphitropous; style simple; stigma capitate or dilated, simple; occasionally 2-lobed or 2-lamellate. *Fruit* usually a capsule, rarely a berry; placentas sometimes persistent on a central axis, at others attached to margins of valves. *Seeds* small with a lateral or ventral hilum; albumen fleshy, rarely absent; embryo straight or curved.—DISTRIB. Species 2,000 or more, in all regions.

*Angelonia grandiflora*, C. Morr., an American species, has become naturalised as an escape from gardens in Selangor (*Goodenough* in Herb. Ridley 10486); it has long been similarly naturalised in Tenasserim and the Irawadi Delta, and has more recently become established in the Gangetic Delta.

Corolla with upper lip or two upper lobes outmost in bud :—

Stamens 4, fertile :—

All 4 filaments inserted within corolla-tube :—

Trees or epiphytes .. .. . 1. WIGHTIA.

Herbs :—

Throat of corolla plicate, forming a 2-lobed palate; anther-cells contiguous, divaricate .. .. . 2. MAZUS.

Throat of corolla not plicate :—

Anther-cells discrete, stipitate; corolla distinctly 2-lipped :—

Upper lobe of calyx distinctly exceeding the others; 2 or sometimes all the anthers with one cell imperfect .. .. . 3. ADENOSMA.

Upper lobe of calyx hardly if at all exceeding the others; all 4 stamens with perfect anthers .. .. . 4. LIMNOPHILA.

Anther-cells contiguous; lateral calyx-lobes much narrower than the other three; corolla sub-equally 5-lobed .. .. . 5. HERPESTIS.

Only 2 posterior filaments inserted within corolla-tube; the anterior pair inserted on corolla-throat :—

Calyx with 3 to 5 distinct ridges or wings .. .. . 6. TORENIA.

- Calyx without wings or ridges :—  
 Calyx-segments narrow .. .. 7. VANDELLIA.  
 Calyx-segments broad .. .. 8. ARTANEMA.  
 Stamens only 2 posterior fertile, inserted within corolla-tube ;  
 anterior pair reduced to staminodes on corolla-throat :—  
 Calyx 4-lobed, the outer lobes very broad .. .. 9. CURANGA.  
 Calyx 5-lobed, the lobes all narrow .. .. 10. BONNAYA.  
 Corolla with upper lip or 2 upper lobes inmost in bud ; rarely  
 lobes imbricate :—  
 Corolla-tube very short ; lobes 4, sub-equal, imbricate ; stamens  
 4, sub-equal .. .. 11. SCOPARIA.  
 Corolla-tube elongated ; lobes 5, 2-labiate :—  
 Calyx tubular, 5-lobed .. .. 12. STRIGA.  
 Calyx spathaceous, split in front .. .. 13. CENTRANTHERA.

### 1. WIGHTIA, Wall.

Large epiphytic climbers, eventually becoming trees. *Leaves* mostly or all opposite, quite entire, coriaceous. *Flowers* in usually axillary, often thyrsoïd racemes ; large, rosy or purple, pubescent. *Calyx* campanulate, irregularly 3–5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed, lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted ; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved ; stigma simple. *Capsule* oblong-ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous, broadly winged all round ; albumen 0 ; embryo straight. —DISTRIB. Species 3, all S.E. Asiatic.

The species of this genus exhibit the primarily epiphytic but subsequently arboreal habit characteristic of many species of *Ficus*. Though often loosely spoken of as parasites, and though, as a matter of fact, they frequently strangle the trees on which they become established, epiphytes of this class are not parasites in the physiological sense.

WIGHTIA BORNEENSIS, Hook. f. in Ic. Plant. XV. 35, t. 1444 (1883). A tree, 20 feet in height and upwards, commencing life as an epiphyte and flowering most freely in that condition. *Leaves* opposite, thinly coriaceous, glabrous as are the lenticellate branchlets, drying brown, margin entire, outline elliptic, apex obtusely acuminate, base cuneate, narrowed to the petiole, main-nerves 2–3-jugate ; length 3 to 4 in., breadth 1·25 to 1·75 in. ; petiole ·75 in. long. *Flowers* opposite or whorled on the rachis of axillary or terminal racemes, pedicels slender, rigid, spreading, ·5 in. long ; rachis stout, glabrous, erect, 6–10-flowered, 3 to 6 in. long. *Calyx* campanulate, margin entire, ·4 in. across. *Corolla* trumpet-shaped, incurved, purple, densely beset with a fine stellate tomentum, 2 in. long, lobes rounded, throat slightly enlarged. *Stamens* inserted near base of corolla ; filaments slender, far-exserted ;

anthers sagittate. *Ovary* glabrous; style filiform; stigma simple. *Fruit* not seen.

PERAK: Larut Hill at 3,000 feet, Derry (Herb. Curtis, n. 3710) !—  
DISTRIB. Borneo.

The solitary Perak specimen agrees well with a specimen from Borneo in Herb. Kew; as our Perak example is destitute of leaves the description of these is based on a second Bornean example of the plant. The species is most readily distinguished from the other two known species by its entire calyx-limb.

## 2. MAZUS, Lour.

Small herbs, often surculose. *Leaves* rosulate or opposite below, opposite or alternate above. *Flowers* in terminal, sub-second racemes; bracts minute or 0; bracteoles 0. *Calyx* campanulate, 5-fid; lobes large, leafy. *Corolla* 2-lipped; tube short, upper lip erect, ovate, 2-fid; lower longer, spreading, 3-fid; throat with a 2-lobed palate. *Stamens* 4, didynamous; anther-cells contiguous, divaricate. *Ovary* 2-celled; style short; stigma 2-lamellate; ovules numerous. *Capsule* globose or compressed, loculicidal, 2-valved, included. *Seeds* many, ovoid, very minute.—DISTRIB. Species about 5, Asiatic and Australian.

MAZUS RUGOSUS, Lour. Flor. Cochinchina. 385. A small annual glabrous or sparingly hirsute herb. *Leaves* many, radical, obovate-spathulate, irregularly coarsely crenate, narrowed to a short petiole, .75 to 3 in. long. *Scapes* numerous from the root, 2 to 10 in. long, leafless or with a few alternate spathulate leaves, with terminal racemes 1 to 6 in. long, the pedicels slender, .25 to .5 in. long, usually without bracteoles. *Calyx* campanulate, .25 in. long, lobes ovate-lanceolate, acute, half as long as tube, spreading in fruit. *Corolla* pale blue, .3 in. long. *Capsule* .2 in. long, included in the calyx; calyx-mouth in front .3 to .5 in. across. *Seeds* very minute; testa pale straw-coloured. Benth. in DC. Prod. X. 375; Boiss. Fl. Orient. IV. 424; Miq. Flor. Ind. Bat. II. 677; Hook. f. Flor. Brit. Ind. IV. 259. *M. bicolor*, Benth. in Wall. Cat. 3913. *M. vandellioides*, Hance in Walp. Ann. III. 193. *Lindernia japonica*, Thunb. Flor. Japon. 253. *Hornemannia bicolor*, Willd. Enum. Hort. Berol. 654; Reichb. Icon. Exot. 25, t. 37. *Columnea tomentosa*, Roxb. Flor. Ind. III. 98. *Stemodia tomentosa*, G. Don Gen. Syst. Gard. IV. 842. *Tittmannia obovata*, Bunge Enum. Pl. Chin. 279. *Vandellia obovata*, Walp. Act. Acad. Leopold. XIX., Suppl. I. 394. *Gratiola goodenifolia*, Hornem. Hort. Hafn.

SINGAPORE: a garden weed, Ridley !—DISTRIB. E. and S.E. Asia generally.

## 3. ADENOSMA, R. Br.

Annual, villous or glandular aromatic herbs. *Leaves* opposite, rugose, crenulate. *Flowers* axillary or in leafy spikes, racemes or

heads; bracteoles conspicuous or absent. *Calyx* deeply 5-lobed; lobes imbricate, the upper the largest; sometimes in fruit all enlarged. *Corolla* 2-lipped; upper lip erect, entire or notched, outmost in bud; lower 3-lobed, spreading; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells discrete, stipitate, one cell of each anterior stamen or of all four stamens empty. *Ovary* 2-celled; ovules in each cell numerous; style filiform below, winged upwards under the entire or 2-lamellate stigma. *Fruit* an ovoid, ellipsoid, or lanceolate 2-grooved and 4-valved capsule, opening both loculicidally and septicidally. *Seeds* many, minute, reticulate.—DISTRIB. Species about 10, in S.E. Asia and Australia.

Flowers axillary; outer fruiting sepals enlarged:—

Leaves ovate-obtuse, crenate-serrate	..	..	1. <i>A. ovatum</i> .
Leaves ovate-acute, serrate	..	..	2. <i>A. inopinatum</i> .

Flowers in terminal heads, spikes or racemes; sepals little altered:—

Bracts linear, hardly exceeding the calyx:—

Spikes short, dense, cylindric or capitate	..	..	3. <i>A. capitatum</i> .
Spikes long, slender	..	..	4. <i>A. cœruleum</i> .
Bracts leafy, elliptic, acute, longer than calyx	..	..	5. <i>A. hirsutum</i> .

1. *ADENOSMA OVATUM*, Benth. in Hook. fil. Flor. Brit. Ind. IV. 263. A puberulous or glabrate herb, branched from the base; branches rooting below, prostrate or ascending, 6 to 18 in. long. *Leaves* ovate-obtuse, crenate-serrate, base wide-cuneate, rounded or truncate; blade .75 in. long, .5 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than the calyx. *Calyx* of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, pubescent, the 3 outer enlarged, .35 in. wide, ovate-cordate, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones. *Herpestis ovata*, Benth. Scroph. Ind. 30; Wall. Cat. 3896. *H. javanica*, Bl. Bijdr. 748. *Pterostigma ovatum*, Benth. in DC. Prod. X. 380; Miq. Flor. Ind. Bat. II. 678.

PERAK: Gunong Tundul, *Ridley* 9444! PENANG: Waterfall, *Curtis*! MALACCA: *Griffith*! SINGAPORE: Bukit Timah, *Ridley* 6894! "a garden weed," *Ridley* 8910!—DISTRIB. Indo-China, Malay Archipelago.

2. *ADENOSMA INOPINATUM*, Prain Journ. As. Soc. Beng. LXXII. 2, 16. A pubescent herb, branched from the base; branches rooting below, ascending, 6 to 18 in. long. *Leaves* ovate-acute, serrate, base cuneate; blade 1 to 1.5 in. long, .75 to 1 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than calyx. *Calyx*

of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, the 3 outer enlarged, .25 in. wide, ovate-lanceolate with truncate bases, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones.

MALACCA: *Griffith*! SINGAPORE: *Anderson*! *King's Collector*!

Very nearly allied to *A. ovatum*, Benth., and *A. subrepens*, Benth. It differs from both by its acute leaves, but except in this respect and as regards its distribution it is hardly separable from *A. subrepens* of Ceylon. From *A. ovatum* of Tenasserim, with which it has been confused, it further differs in its larger size, coarser habit of growth, and much narrower outer sepals. It has also been confused with *A. cœruleum*, from which it differs by its flowers being all axillary and by its enlarged fruiting sepals.

3. *ADENOSMA CAPITATUM*, Benth. in Hook. f. Flor. Brit. Ind. IV. 264. A stout, erect, glandular-villous herb, 1 to 2 feet high. *Leaves* ovate or oblong, sub-acute, serrate, often reflexed; base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide; petiole very short. *Flowers* in dense cylindrical or globose terminal or axillary heads, with basal involucre of floral leaves; peduncles 1 in. or less, sometimes in the lower clusters sub-obsolete and the flowers in axillary whorls; heads usually .5 in. across, sometimes longer up to 4 in. long; bracts linear, hardly exceeding the sepals. *Calyx* of 5 almost free sepals, villous with long hairs, .25 in. long, the uppermost ovate-lanceolate, broader than the other lanceolate. *Corolla* blue. *Capsule* ovoid, .2 in. long. *Stemodia capitata*, Benth. in Bot. Reg. under t. 1470; Wall. Cat. 3926. *Pterostigma spicatum*, Benth. Scroph. Ind. 21. *P. capitatum*, Benth. Scroph. Ind. 31, and in DC. Prod. X. 380. *Erinus bilabiatus*, Roxb. Fl. Ind. III. 92.

PROV. WELLESLEY: *King*! *King's Collector*. PENANG: *Wallich*; *Deschamps*! *Curtis*! SINGAPORE: *King*! *Ridley*! MALACCA: *Cuming*! Ayer Keroh, *Ridley*! *Griffith*; *Wallich*. NEGRI SEMBILAN: Kwala Pedas, *Ridley*! PAHANG: *Ridley*!—DISTRIB. Throughout S.E. Asia.

4. *ADENOSMA CÆRULEUM*, R. Br. Prod. 443. An erect herb, 1 to 2 feet high, viscidly pubescent. *Leaves* ovate-acute, crenate, base rounded or cordate; blade 1.5 to 2.5 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* in long slender strict spikes; bracts lanceolate, about as long as calyx. *Calyx* of 5 almost free sepals, the upper lanceolate the rest linear, not very greatly altered in fruit. *Corolla* blue. *Capsule* lanceolate, rather longer than the sepals. Benth. Flor. Austral. IV. 484; Hook. f. Flor. Brit. Ind. IV. 263. *Pterostigma villosum*, Benth. Scroph. Ind. 21, and in DC. Prod. X. 380 partly; Miq. Flor. Ind. Bat. II. 678. *P. strictum*, Griff. Not. IV. 96; Ic. Pl. Asiat. t. 417, f. 3. *Stemodia cœrulea*, Benth. in DC. Prod. X. 381. *Herpestis lanuginosa*, Bl. Bijdr. 747.

SELANGOR: *Ridley* ! PERAK: *Scortechini* ! WRAY ! MALACCA :  
*Griffith* ! *Cuming* ! *Maingay* ; *Hervey* ! SINGAPORE : *Cuming* ! *Wallich*.  
 —DISTRIB. Indo-China, Malaya, Australia.

*Scortechini* notes on this, "aromatic ; most likely introduced." It appears, however, to be native.

5. *ADENOSMA HIRSUTUM*, Kurz Journ. As. Soc. Beng. XLV. 2. 143.  
 A stout, erect, villous herb, 2 to 3 feet high. *Leaves* ovate or elliptic, sub-acute, serrate, base cuneate ; blade 1 to 2 in. long, .5 to .75 in. wide ; petiole very short or 0. *Flowers* in dense cylindric or oblong heads, often ternate, usually peduncled, with closely imbricate hirsute leafy bracts ; peduncles sometimes 1.5 in. long ; heads 1 to 3 in. long, .75 to 1 in. wide ; bracts ovate-acute, serrate, .4 to .6 in. long. *Calyx* of 5 almost free villous linear sepals, .25 in. long. *Corolla* blue. *Capsule* ovate, abruptly beaked, as long as calyx. *Pterostigma hirsutum*, Miq. Flor. Ind. Bat. Suppl. 562. *P. villosum*, Miq. l.c. (not of Benth.).

PROVINCE WELLESLEY: *Curtis* 2238 ! *Ridley* 6977 ! NICOBARS :  
 Kamorta, *Kurz* !—DISTRIB. Sumatra (*Teysmann* 1157), Bangka (*Teysmann* 3429), Borneo (*Motley*, n. 215).

A coarser plant than *A. capitatum*, with leafy bracts throughout the spikes.

#### 4. *LIMNOPHILA*, R. Br.

Herbs of marshes and pools, glabrous or pubescent, aromatic. *Leaves* with transparent dots, opposite or whorled, toothed or cut, when submerged frequently laciniate-multifid. *Flowers* solitary axillary, sessile or pedicelled, or passing into terminal spikes or racemes ; bracts leafy ; bracteoles small or obsolete. *Calyx* 5-partite ; lobes narrow, imbricate, all equal or the upper largest. *Corolla* 2-labiate ; upper lip outmost, sub-erect, entire or 2-fid ; lower spreading, 3-lobed ; throat not plicate ; tube cylindric. *Stamens* 4, didynamous, included ; anther-cells all perfect, usually discrete, stipitate, occasionally contiguous. *Ovary* 2-celled ; ovules in each cell numerous ; style slender, with deflexed tip and 2-lamellate stigma. *Fruit* an ovoid or oblong capsule, with both septicial and loculicidal dehiscence, the placentiferous septum separating from the valves. *Seeds* many, minute, angular and truncate, reticulate.—DISTRIB. Species about 25, in the tropics of the Eastern Hemisphere and Australia.

Leaves never pinnatifid above, very rarely so even on lower portion of stem :—

Flowers sessile :—

Leaves at least 1 in. long :—

Leaves petioled, 2 to 3 in. long, pubescent or glabrous .. 1. *L. Roxburghii*.



- Leaves sessile, 1 to 2 in. long, softly pubescent .. 2. *L. balsamea*.  
 Leaves glabrous, never exceeding .5 in. long .. 3. *L. micrantha*.  
 Flowers pedicelled :—  
 Leaves hirsute :—  
 Leaves usually opposite, rarely 3-nate, never more than  
 .75 in. long ; flowers always axillary, solitary .. 4. *L. villosa*.  
 Leaves usually 3–4-nately whorled, rarely opposite, never  
 less than 1.5 in. long ; flowers usually cymose or panicu-  
 late, rarely axillary, solitary .. .. 5. *L. hirsuta*.  
 Leaves glabrous :—  
 Leaves cuneate at base, always opposite ; flowers axillary,  
 solitary :—  
 Stems creeping ; branches many, divaricate ; pedicels in  
 fruit erect .. .. 6. *L. pygmaea*.  
 Stems erect, usually simple ; pedicels in fruit recurved.. 7. *L. erecta*.  
 Leaves half-amplexicaul at base, often 3–4-nately whorled,  
 flowers usually in many-flowered racemes, rarely axillary,  
 solitary .. .. 8. *L. gratissima*.  
 Leaves mostly or all lobulate or pinnatisect, or capillary multi-  
 fid :—  
 Flowers sessile or shortly pedicelled ; uppermost leaves entire :—  
 Flowers all solitary .. .. 9. *L. sessiliflora*.  
 Flowers passing into a terminal spike .. .. { 10. *L. heterophylla*,  
 VAR. *reflexa*.  
 Flowers all pedicelled, the pedicels exceeding the calyx ; all the  
 leaves capillary multifid .. .. 11. *L. Griffithii*.

1. *LIMNOPHILA* ROXBURGHII, G. Don Gen. Syst. IV. 543 (*not of* Benth.). A stout glabrous or pubescent aromatic herb, with a creeping rootstock and with decumbent rooting base, giving off numerous erect stems 1 to 2 feet high. *Leaves* opposite, petioled, elliptic or ovate, obtuse or sub-acute, margin crenulate, base cuneate, punctate beneath, nerves distinct, 8 to 10 pairs ; length up to 4 in., width to 2 in. ; petiole .75 in. *Flowers* sessile, in axillary peduncled heads, rarely solitary. *Calyx* hirsute, .2 in. long ; lobes lanceolate, finely acuminate in fruit, not striate. *Corolla* .35 in. long, purplish-blue with a yellow throat. *Capsule* .2 in. long, elliptic, sub-acute. Hook. f. Flor. Brit. Ind. IV. 265. *L. Menthastrum*, Benth. in DC. Prod. X. 386 ; Maxim. Mel. Biol. IX. 406. *Herpestis rugosa*, Roth Nov. Sp. 290. *Capraria gratissima*, Roxb. Fl. Ind. III. 92 (*in part*). *Stemodia Menthastrum*, Benth. Scroph. Ind. 23 ; Wall. Cat. 3927. *Adenosma triflora*, Seem. Fl. Vit. 184 (*not of* Nees). *Eclipta scabriuscula*, Wall. Cat. 3212.

KEDAH : Langkawi, at Coah, Curtis 2556 !—DISTRIB. Himalaya, from Chamba eastward, N. and C. India, Indo-China, Philippines, China.

The bases of the stems are often submerged, and besides the fibrous roots then emitted the lower nodes at times have multifid submerged leaves. The plant smells strongly of Aniseed.

2. *LIMNOPHILA BALSAMEA*, Benth. in DC. Prod. X. 386. A stoutish, softly pubescent herb; stem 1 to 2 feet high. *Leaves* opposite, elliptic, sub-acute, narrowed from the middle to the base with margin entire, beyond the middle obscurely crenulate, punctate beneath, nerves slender, 3 to 5 pairs; length up to 2 in., width to 1 in.; petiole 0. *Flowers* in short peduncled axillary heads or spikes. *Calyx* hirsute, .15 in. long; lobes lanceolate, finely acuminate; in fruit striate. *Corolla* .35 in. long. *Capsule* .2 in. long, broadly elliptic, obtuse. Hook. f. Flor. Brit. Ind. IV. 266. *Stemodia balsamea*, Benth. Scroph. Ind. 23; Wall. Cat. 3928.

PERAK: *King's Collector* 1027!—DISTRIB. Indo-China.

3. *LIMNOPHILA MICRANTHA*, Benth. in DC. Prod. X. 387. A small, stoutish, glabrous herb, creeping below; stem 3 to 6 in. long, branching from the base. *Leaves* all opposite, crowded, thick, .25 to .45 in. long, margin entire or very sparingly sub-serrate, punctate beneath; nerves obscure; petiole 0. *Flowers* axillary, sub-sessile, small. *Calyx* .06 in. long, glabrous; lobes subulate, in fruit striate. *Corolla* reddish-purple, .12 in. long. *Capsule* ovate, .08 in. long. Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia micrantha*, Benth. Scroph. Ind. 23; Wall. Cat. 3936. *Herpestris pygmaea*, Griff. Notul. IV. 104.

PAHANG: *Ridley*!—DISTRIB. Indo-China, Bengal.

4. *LIMNOPHILA VILLOSA*, Bl. Bijdr. 750. An erect or spreading, sub-simple, stoutish or slender, pubescent herb; stems 4 to 6 in. high. *Leaves* opposite, elliptic-oblong, sub-crenate, .5 to .75 in. long, punctate beneath, nerves obscure; petiole 0. *Flowers* axillary, solitary, on short pubescent pedicels, .15 in. long, erect in fruit. *Calyx* hirsute, .15 in. long, lobes lanceolate, acuminate-subulate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 681. *L. laxa*, Benth. in DC. Prod. X. 388 partly. *L. pulcherrima*, Hook. f. Flor. Brit. Ind. IV. 267. *Herpestis pulcherrima*, Griff. Notul. IV. 104.

PERAK: *Wray* 788! MALACCA: *Griffith*! *Cuming*! *Maingay*! *Ridley*! *Hervey*! PENANG: *Tulloh Bahang*, *Curtis*! *Ridley* 7104! PAHANG: *Ridley*! SINGAPORE: *King's Collector*! *Hullett*! *Deschamps*! *Kurz*! *Ridley*! PROVINCE WELLESLEY: *King*! SALAMA: *Scortechini*!—DISTRIB. Sumatra, Java.

5. *LIMNOPHILA HIRSUTA*, Benth. in DC. Prod. X. 388. An erect hirsute herb; stem 6 to 8 in. high. *Leaves* opposite or 3-4-nately whorled, elliptic, linear-oblong or sub-spathulate, 1.5 to 2.5 in. long, apex obtuse, margin serrulate, punctate beneath, nerves few, very indistinct; petiole short or obsolete. *Flowers* axillary, solitary or cymose or paniculate at the apex of the stem; pedicels .2 to .75 in.

bracteoles minute. *Calyx* .3 in. long, hirsute; lobes lanceolate, finely acuminate, in fruit striate. *Corolla* .5 in. long. *Capsule* sub-orbicular, .25 in. long. Hook. f. Flor. Brit. Ind. IV. 268. *L. javanica*, A. DC. in DC. Prod. X. 594. *Stemodia hirsuta*, Heyne, ex Wall. in Cat. 3930; Benth. Scroph. Ind. 24. *Ambulia ebracteata*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 268.

NICOBARS: *Kurz*! PERAK: *Scortechini*! *Kunstler*! MALACCA: *Ridley*!—DISTRIB. India, Indo-China, Malay Archipelago, China.

6. *LIMNOPHILA PYGMÆA*, Hook. f. Flor. Brit. Ind. IV. 268. A very small, glabrous, much-branched creeping herb; branches 4 to 6 in. long, divaricate. *Leaves* opposite, .3 to .4 in. long, oblong-lanceolate, apex acute, margin sub-serrate; punctate beneath, nerves very obscure; petiole 0. *Flowers* axillary, solitary, pedicels slender, .15 to .2 in. long, erect in fruit. *Calyx* .15 in. long, hirsute, lobes subulate-lanceolate, striate in fruit. *Corolla* .2 in. long. *Capsule* .15 in., ovate. *Herpestis pygmæa*, Griff. Notul. IV. 104. *Stemodia diffusa*, Benth. in Wall. Cat. 3937.

MALACCA: *Griffith*! *Cuming*!—DISTRIB. Tenasserim.

7. *LIMNOPHILA ERECTA*, Benth. in DC. Prod. X. 388. An erect, sub-simple or branched, stoutish glabrous herb; stems 4 to 8 in. high. *Leaves* all opposite, linear-oblong, .5 to 1 in. long, apex acute, margin sub-serrate except the narrow cuneate base, punctate beneath, nerves obscure; petiole very short or obsolete. *Flowers* white, axillary, solitary, on short pedicels, .1 in. long, recurved in fruit. *Calyx* glabrous, .15 in. long, lobes lanceolate, acuminate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Maxim. Mel. Biol. IX. 406; Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia gratioides*, Benth. Scroph. Ind. 25; Wall. Cat. 3938.

PERAK: *Scortechini*! *Wray*! *King's Collector*! NEGRI SEMBILAN: *Ridley*! SELANGOR: *Ridley*! PAHANG: *Ridley*!—DISTRIB. Indo-China, Bengal, S. China.

8. *LIMNOPHILA GRATISSIMA*, Bl. Bijdr. 749. An erect, glabrous herb with a stout stem, 1 to 2 feet high, simple or occasionally branched above. *Leaves* opposite and ternate, half-amplexicaul, linear-oblong, 1.5 to 2.5 in. long, apex sub-acute, margin serrulate, punctate beneath, nerves few, indistinct; petiole 0. *Flowers* in axillary and terminal many-flowered racemes, rarely flowers axillary solitary, sometimes the racemes 12 in. long and paniculately branched with the flowers whorled, at others the racemes reduced; pedicels .5 to 1 in. long, glandular; bracteoles minute. *Calyx* .3 in. long, glabrate, lobes lanceolate-acuminate; in fruit calyx hemispherical with lobes striate. *Corolla* .5 in. long. *Capsule* oblong, acute, .3 in. long. Benth. Scroph. Ind. 26;

Wall. Cat. 3906; Hook. f. Flor. Brit. Ind. IV. 268. *L. punctata*, Bl. Bijdr. 750; Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 682; Maxim. Mel. Biol. IX. 406. *Gratiola aromatica*, Pers. Synops. I. 14. *Ambulia aromatica*, Lamk Encycl. Meth. I. 128. Rheede Hort. Malab. X. 6.

MALACCA: *Griffith*. PERAK: *King's Collector*! *Wray*!—DISTRIB. S.E. Asia generally, N. Australia.

9. *LIMNOPHILA SESSIFLORA*, Blume Bijdr. 750. A hirsute or rarely glabrate herb; stem stoutish, 4 to 8 in. long. *Leaves* 3 to 6 in a whorl throughout all lobulate or pinnatisect, or the uppermost very rarely opposite entire, usually about 4 to 5 in. long. *Flowers* axillary solitary, sessile or shortly pedicelled. *Calyx* 3 in. long, lobes ovate-acuminate, tube in fruit membranous, hemispheric, not striate. *Corolla* 5 in. long. *Capsule* orbicular, turgid, 2 in. across. Benth. Scroph. Ind. 25; Wall. Cat. 3902; DC. Prod. X. 389; Miq. Flor. Ind. Bat. II. 683; Hook. f. Flor. Brit. Ind. IV. 270. *Hottonia sessiliflora*, Vahl Symb. II. 36.

KEDAH: Langkawi, in swamps, *Curtis*!—DISTRIB. Throughout S.E. Asia.

10. *LIMNOPHILA HETEROPHYLLA*, Benth.; var. *reflexa*, Hook. f. Flor. Brit. Ind. IV. 270. A glabrous herb with a very slender elongated stem, 1 to 1.5 feet long. *Leaves* towards apex of stem usually opposite, small, rarely over .25 in. long, sessile, half-amplexicaul, oblong, margin crenulate; followed by pinnatifid leaves 4 to 6 in a whorl, .5 in. long; with below these submerged whorled and very finely capillary-multifid leaves, .5 in. long. *Flowers* axillary solitary, the upper sub-sessile passing into a short leafy spike, the lower pedicelled, with pedicels recurved in fruit and longer than the calyx. *Calyx* .25 in. long, lobes ovate, very shortly acuminate, in fruit not at all striate; tube in fruit hemispheric, membranous. *Corolla* .4 in. long. *Capsule* sub-globose, .3 in. long. *L. reflexa*, Benth. Scroph. Ind. 25; DC. Prod. X. 389; Wall. Cat. 3904.

MALACCA: *Cuming*. KEDAH: *Curtis* 2103!—DISTRIB. (of variety,) Tenasserim: (of type,) throughout S.E. Asia.

This variety differs from the type in having distinctly shorter *submerged* leaves, and distinctly longer pedicels to the lower flowers.

11. *LIMNOPHILA GRIFFITHII*, Hook. f. Flor. Brit. Ind. IV. 271. A very small herb with creeping tufted stems, sending down long rigid roots and emitting many erect branches, 1 to 2 in. long, sometimes stout and stiff, sometimes slender and flaccid. *Leaves* .25 to .35 in. long, usually densely whorled and imbricated, multifid. *Flowers* axillary solitary, on slender pedicels, .35 to .5 in. long, that are deflexed

in fruit. *Calyx* .1 in. long, teeth short. *Corolla* pure white, .4 in. long. *L. sessiliflora*, Griff. Notul. IV. 99, t. 418, f. 5 (not of Bl.). *L. gratio- loides* var. *myriophylloides*, Benth. in DC. Prod. X. 389 partly. *Quin- quelobus glaber*, Benj. in Linnæa XX. 316. *Benjaminea glabra*, Benj. in Linnæa XX. 761.

MALACCA: *Griffith! Leman, Cuming! Maingay!* PERAK: *King's Collector!*

Griffith's specimens have slightly larger leaf-segments and shorter pedicels than those of Maingay, Cuming, and Kunstler, where the leaf-segments are finely capillary. But Griffith's plant evidently grew on mud, while that of Kunstler was floating in water, and the difference of habitat probably sufficiently explains the difference in foliage. The flowers of the two forms are the same.

## 5. HERPESTIS, Gaertn. f.

Herbs, glabrous. *Leaves* often dotted, entire or toothed, or below submerged and multifid. *Flowers* axillary or racemose; bracteoles small or obsolete. *Calyx* 5-partite; lobes imbricate, the upper largest, the two lateral inmost often very narrow. *Corolla* indistinctly 2-lipped; upper lip outmost spreading, 2-lobed or only emarginate, lower 3-lobed; tube cylindric. *Stamens* 4, didynamous, included; anthers sometimes approximate in pairs; cells contiguous, parallel, not confluent. *Ovary* 2-celled; ovules in each cell numerous; style dilated at the top; stigma entire or 2-lobed. *Fruit* a globose or ovoid 2-celled capsule; valves 2 or 4, separating from the placentiferous septum. *Seeds* many, very minute.—DISTRIB. Species about 50, throughout the tropics.

HERPESTIS MONNIERIA, H. B. & K. Nov. Gen. and Sp. II. 366. A glabrous, rather succulent creeping herb, rooting at the nodes; branches 4 to 10 in. long. *Leaves* obovate-oblong, spatulate, sessile, obtuse, entire, .5 to .75 in. long. *Flowers* axillary, peduncles usually .75 to 1 in. long; bracteoles 2. *Calyx* of 5 nearly free sepals, .2 to .3 in. long, the upper sepal ovate. *Corolla* white, faintly tinged with blue, .4 to .6 in. long, lobes sub-equal. *Capsule* ovoid, acute, hidden by the sepals, .15 to .25 in. long. *Seeds* minute, irregular; testa pale. Benth. Scroph. Ind. 30, and in DC. Prod. X. 410; Wall. Cat. 3900; Dalz. & Gibs. Bomb. Flor. 178; Miq. Flor. Ind. Bat. II. 685; Bot. Mag. t. 2557; Boiss. Flor. Orient. IV. 426; Hook. f. Flor. Brit. Ind. IV. 272. *H. spatulata*, Bl. Bijdr. 748. *Gratiola Monnieria*, Linn. Cent. Pl. II. n. 120; Roxb. Cor. Pl. II. 41, t. 178, and Flor. Ind. I. 141. *Septis repens*, Lour. Flor. Cochinchin. 392. *Bramia indica*, Lamk Encyc. I. 459. Rheede Hort. Malab. X. t. 14.

MALACCA: *Hervey!* JOHORE: *Hullett!* SINGAPORE: *Kurz! Ridley!*—DISTRIB. Throughout the tropics.

## 6. TORENIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, entire or crenate or serrate. *Flowers* often showy, axillary, or in terminal or pseudo-axillary racemes or umbels; bracteoles 0. *Calyx* 2-lipped or 3-5-toothed, 3-5-keeled or -winged or -folded. *Corolla* 2-lipped; upper lip outmost erect, concave or pinched, notched or 2-fid; lower larger spreading, 3-lobed; tube cylindric, somewhat curved, dilated upwards. *Stamens* 4, didynamous; upper pair included inserted on corolla-tube; lower inserted on throat, appendaged or not at base, and connivent under upper lip; anthers contiguous or connate in pairs, cells often confluent. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a linear or oblong, included septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, rugose or cancellate.—DISTRIB. Species 20, Tropical Asiatic and African, one American.

Calyx very distinctly winged:—

Fruiting calyx sub-orbicular, as broad as long; stems prostrate and rooting .. .. .

1. *T. polygonoides*.

Fruiting calyx longer than broad; stems erect:—

Wings broad distinctly decurrent on the pedicels; corolla very little exserted; bracteoles very small; pedicels shorter than the calyx .. .. .

2. *T. peduncularis*.

Wings narrow hardly decurrent on the pedicels; corolla distinctly exserted; bracteoles large; pedicels as long as or longer than the calyx .. .. .

3. *T. ciliata*.

Calyx hardly or not at all winged:—

Flowers all axillary:—

Stems and leaves glabrous; calyx deeply lobed, faintly winged .. .. .

4. *T. asiatica*.

Stems and leaves hirsute; calyx wingless, shortly lobed .. .. .

5. *T. Benthamiana*.

Flowers in terminal racemes; stems and leaves hirsute; calyx wingless, shortly lobed .. .. .

6. *T. flava*.

1. *TORENIA POLYGONOIDES*, Benth. Scroph. Ind. 39. A slender straggling herb; branches 6 to 12 in. long, decumbent and often rooting at the nodes; all parts glabrous. *Leaves* orbicular-ovate, serrate; lamina .4 to .5 in. long, .35 to .45 in. wide, apex acute or sub-acute, base cuneate; petiole slender, .25 in. long. *Flowers* axillary on 2-4-flowered peduncles; pedicels .25 in. long, slender; bracteoles minute. *Calyx* tubular with very wide wings, in fruit sub-orbicular .3 in. in diam. *Corolla* .35 in. long, white or white and pink, distinctly exserted. DC. Prod. X. 409; Miq. Flor. Ind. Bat. II. 688; Hook. f. Flor. Brit. Ind. IV. 276. *T. cardiosepala*, Benth. in DC. Prod. X. 409. *Herpestis polygonoides*, Benth. in Wall. Cat. 3897.

SINGAPORE: *Wallich* 3897! *King's Collector*! *Hullett*! *Murton*, *Kuntze*! *Schomburgk*! *Anderson*! *Kurz*! MALACCA: *Maingay*! *Griffith*! *Goodenough*! PENANG: *Bouton*; *Deschamps*! PERAK: *Gapis Pass*, *Curtis* 2683!

2. *TORENIA PEDUNCULARIS*, Benth. in Wall. Cat. 3956. An erect annual herb 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with recurved hairs. *Leaves* ovate-lanceolate, base cordate, apex acuminate, margin serrate; lamina membranous 1 to 2 in. long, .5 to 1 in. wide, sparingly hairy on both surfaces; petiole slender, sparsely hirsute, .5 to .75 in. long. *Flowers* axillary solitary, or the uppermost in a sub-umbellate corymb or a terminal raceme, the lowest in the raceme leaf-opposed; pedicels .3 in., in fruit .5 in. long, thickened upwards, shorter than the calyx; bracteoles linear-subulate small. *Calyx-tube* narrow-ovate, .6 in., in fruit .85 in. long, wings broad, decurrent on the pedicel, the margins ciliate. *Corolla* .75 in. long, little exserted, tube yellow below, pale blue above, lateral lobes of lip with darker blotches. *Stamens* with glabrous filaments not appendaged. *Disk* cupular. Hook. f. Flor. Brit. Ind. IV. 276. *T. edentula*, Benth. in DC. Prod. X. 410; Bot. Mag. t. 4229.

PENANG: *Schomburgk*! MALACCA: *Goodenough*! PERAK: *Scortechini*! *Ridley* 9457! 9758! Ipoh, *Curtis*! NICOBARS: *Kamorta*, *Kurz*!—DISTRIB. Indo-China, Java, Timor.

3. *TORENIA CILIATA*, Sm. in Rees Cyclop. V. 36. An erect annual herb, 1 to 2 feet high, branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles. *Leaves* ovate, base wide cuneate, apex obtuse or sub-acute, margin entire or crenate; lamina membranous 1.5 to 2.5 in. long, .75 to 1.25 in. wide, sparingly hairy on both surfaces; petiole winged above .25 to .5 in. long, sometimes shorter. *Flowers* in distant pairs, racemed at the ends of the branches; pedicels .3 in., in fruit .4 in. long, thickened upwards, as long as or longer than the calyx; bracteoles .3 in. long, linear, hirsute, as long as the flowering pedicels. *Calyx* very narrow-tubular, .4 in., in fruit .6 in. long, wings distinct but narrow, the margins ciliate. *Corolla* .75 in. long, distinctly exserted, light blue. Benth. in DC. Prod. X. 411; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 279. *T. racemosa*, Benth. Scroph. Ind. 38 (not of Griff.). *T. cærulea*, Miq. Flor. Ind. Bat. Suppl. 562. *T. flava*, Wall. Cat. 3957 (in part); Miq. Flor. Ind. Bat. Suppl. 562 (not of Ham).

PENANG: *Wallich*! *Deschamps*! PERAK: *King's Collector*! *Scortechini*! *Ridley*!—DISTRIB. Sumatra, Timor.

Very near to *T. peduncularis*, and really only separable by its smaller more winged calyx. It may be remarked that *Kurz* in Herb. Calcutta has suggested that *T. ciliata*

is = *T. peduncularis*, while in the field Scortechini has named *T. peduncularis*, "*T. ciliata*."

4. *TORENIA ASIATICA*, Linn. Sp. Pl. 619. A sub-erect or spreading slightly branching herb, stems quadrangular glabrous. *Leaves* ovate-lanceolate, base cuneate, margin finely serrate; lamina 1·5 to 2·5 in. long, 1 to 1·5 in. wide, membranous, glabrous; petiole slender, glabrous, ·5 in. long. *Flowers* axillary, pedicels ·5 in. long; bracteoles minute subulate. *Calyx* ·5 in. long, deeply 5-partite, lobes narrow-lanceolate, with a prominent midrib. *Corolla* 1·5 in. long, tube narrow-cylindric at base, infundibuliform above, dark violet on both sides, upper lobe erect, lip 3-lobed spreading, all yellowish. *Stamens* with appendages on anterior filaments. *Disk* cupular waved. Wight Ic. t. 862; Benth. in DC. Prod. X. 410; Wall. Cat. 3953 A. B.; Miq. Flor. Ind. Bat. II. 689; Gaertn. Fruct. III. 29, t. 184; Lamk Ill. t. 523; Bot. Mag. t. 4249; Lem. Ill. Hort. t. 199; Flore des Serres II. t. 157; XIII. t. 1342; Hook. f. Flor. Brit. Ind. IV. 277. *Treisteria cordata*, Griff. Notul. IV. 109. Rheede Hort. Malab. IX. t. 53.

PERAK: Scortechini 2212! Ridley 5307! 9756! King's Collector 1816! Curtis! SELANGOR: Ridley 8533!—DISTRIB. India, Sumatra, Java, Indo-China, China.

5. *TORENIA BENTHAMIANA*, Hance Ann. Sc. Nat. Ser. 4. XVIII. 226. A slender straggling herb; branches 6 to 10 in. long, decumbent and often rooting at the nodes, all parts sparingly hirsute. *Leaves* ovate, acute, margin serrate; lamina ·5 to ·75 in. long, ·3 to ·4 in. wide, base truncate or cuneate; petiole ·25 in. long. *Flowers* axillary, solitary, pedicels ·75 to 1·25 in. long, slender; bracteoles minute. *Calyx* very narrow-tubular, ·35 in. long, in fruit ·5 in. long, keeled and channelled but not winged, hirsute with sparse spreading hairs. *Corolla* 1·25 in. long, distinctly exserted; tube violet purple, limb yellow. *T. Bailloni* Godef. in Ill. Hort. XXV. t. 324; E. Morr. in Belg. Hort. XXIX. t. 9, f. 2. *T. flava*, Bot. Mag. t. 6700 (not of Ham.).

JOHORE: Ridley 4160!—DISTRIB. Siam, Cochinchina, S. China.

6. *TORENIA FLAVA*, Ham. in Wall. Cat. 3957. An erect annual herb, 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with spreading hairs. *Leaves* ovate or ovate-oblong, base wide-cuneate, margin entire or crenate; lamina membranous 1 to 1·5 in. long, ·7 to 1 in. wide, hairy on both surfaces; petiole winged above, often very short. *Flowers* racemed at the ends of the branches; pedicels ·2 in., in fruit ·3 in. long, thickened upwards, shorter than the calyx; bracteoles ·4 in. long linear, hirsute, rather longer than the fruiting pedicels. *Calyx* very narrow-tubular ·35 in., in fruit ·5 in. long, keeled and channelled but not winged, hirsute



throughout with sparse spreading hairs. *Corolla* .75 in. long, distinctly exserted, bright yellow. Benth. Scroph. Ind. 38, and in DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 278. *Pentstemon racemosus*, Griff. Notul. IV. 120. *Mimulus hirsutus*, Bl. Bijdr. 756.

PERAK: *Kunstler* 904!—DISTRIB. Indo-China, Malaya.

# 7. VANDELLIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, often toothed, usually penninerved. *Flowers* small, axillary or racemose; bracteoles 0. *Calyx* campanulate, 5-toothed, or oftener deeply 5-partite, neither keeled nor winged. *Corolla* 2-lipped; upper lip outmost, erect, concave, emarginate or 2-fid; lower wider, spreading, 3-lobed; tube cylindric. *Stamens* 4, didynamous; the posterior pair inserted in corolla-tube, usually included, the anterior pair inserted on corolla-throat, with arched filaments appendaged near the base; anthers contiguous or connate in pairs under upper lip, cells divaricate. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose or ovoid, or long cylindric, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species about 30, mostly S.E. Asiatic.

Capsule about equalling or shorter than the calyx :—

Calyx very shortly 5-lobed .. .. 1. *V. crustacea*.

Calyx divided almost to the base in 5 sepals :—

Sepals longer than the capsule :—

Stems erect; all parts sparsely beset with spreading hairs;

leaves entire or sinuate .. .. 2. *V. hirsuta*.

Stems procumbent; all parts softly villous; leaves crenate-serrate .. .. 3. *V. mollis*.

Sepals not longer than the capsule :—

Leaves sessile .. .. 4. *V. scabra*.

Leaves petioled .. .. 5. *V. elata*.

Capsule much longer than the calyx .. .. 6. *V. pedunculata*.

1. VANDELLIA CRUSTACEA, Benth. Scroph. Ind. 35. A diffusely trichotomously branched, glabrous or sparsely hairy herb; branches mostly from near the root; stems 4 to 18 in. high. *Leaves* ovate or lanceolate, entire or serrate; lamina .5 to 1 in. long, .25 to .5 in. wide; petioles short. *Flowers* axillary or sub-racemose; pedicels slender, strict, .5 to 1.5 in. long. *Calyx* shortly 5-lobed, in flower .1 in., in fruit .15 in. long. *Corolla* pale purple or white. *Capsule* ovate-oblong, obtuse, .12 in. long. DC. Prod. X. 413; Wight Ic. t. 863; Miq. Flor. Ind. Bat. II. 690; Hook. f. Flor. Brit. Ind. IV. 279. *V. alba*, Benth.

Scroph. Ind. 35. *Torenia varians*, Roxb. Fl. Ind. III. 96. *T. lucida*, Ham. in Wall. Cat. 3962. *T. alba*, Ham. in Wall. Cat. 3961 partly. *T. flaccida*, R. Br. Prod. 440. *Gratiola lucida*, Vahl Enum. I. 95; Roxb. Cor. Pl. II. 2, t. 202, and Flor. Ind. I. 138. *G. aspera*, Roth Nov. Pl. II. *Peristaira paniculata*, Griff. Notul. IV. 119. *Capraria crustacea*, Linn. Mant. 87. *Morgania lucida*, Spreng. Syst. II. 802. *M. aspera*, Spreng. Syst. II. 803. *Mimulus javanicus*, Bl. Bijdr. 283. *Hornemannia ovata*, Link & Otto Ic. Pl. Sel. I. 9, t. 3. *Tittmannia ovata*, Reichb. Icon. Exot. I. 27. *Antirrhinum hexandrum*, Forsk. Flor. Ægypt.-Arab. 43. Rumph. Herb. Amb. V. t. 170, f. 3.

PENANG: *Curtis!* PROV. WELLESLEY: *King!* PERAK: *Curtis!* SINGAPORE: *Wallich! Schomburgk! Ridley! Hullett! Kunstler! Deschamps! Kurz!* PAHANG: *Ridley!* MALACCA: *Hervey!*—DISTRIB. Cosmopolitan in the tropics.

2. VANDELLIA HIRSUTA, Benth. Scroph. Ind. 36. An erect succulent trichotomously branched herb, 4 to 6 in. high, sparsely clothed with spreading hairs. *Leaves* ovate or oblong, obtuse, entire or sinuate, 1 to 3 in. long; upper sessile .5 to 1 in. wide, lower petioled, .4 to .75 in. wide. *Flowers* minute in many-flowered racemes; pedicels slender, .15 to .2 in. long. *Sepals* lanceolate .08 in., in fruit .1 in. long. *Corolla* blueish-white. *Capsule* orbicular .08 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia ovata*, Benth. in Wall. Cat. 3942. *T. viscosa*, Reichb. Ic. Exot. I. 26, t. 38. *Hornemannia prostrata*, Jacq. Ecl. t. 150.

PERAK: *Kunstler!* PAHANG: *Ridley!* SINGAPORE: *Ridley 2701!*—DISTRIB. S.E. Asia generally.

3. VANDELLIA MOLLIS, Benth. Scroph. Ind. 37. A procumbent herb; stems creeping below, 6 to 18 in. long, slender or stoutish, softly villous with spreading white hairs. *Leaves* ovate or ovate-oblong, obtuse or sub-acute, margin crenate-serrate; both surfaces softly villous with white glistening hairs; nerves 3 to 4 pairs, oblique, ascending; length 1 to 1.5 in., width .5 to .75 in.; petiole short, .2 in. long or less. *Flowers* on axillary pedicels or in axillary or terminal racemes, the pedicels slender, softly villous, .25 to .75 in. long. *Sepals* subulate-lanceolate, softly villous with white hairs, .4 to .5 in. long. *Corolla* .5 to .6 in. long, tube white, upper lip brown and lower lip yellow. *Stamens* with filaments hirsute below, the upper pair with orbicular basal processes. *Capsule* oblong, .2 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 281. *Tittmannia hirta*, Benth. in Wall. Cat. 3948.

SELANGOR: Rawang, *Ridley 7605!*—DISTRIB. Eastern Himalaya, S. China, Indo-China, Sumatra, Java.

4. *VANDELLIA SCABRA*, Benth. Scroph. Ind. 36. A slender diffusely branched herb with rather rigid stems and branches, the latter 2 to 4 in. long; more or less clothed everywhere with long white spreading hairs. *Leaves* broadly ovate or ovate-cordate, or orbicular, serrate or entire, acute or obtuse; lamina .3 to .6 in. long, .3 in. wide. *Flowers* axillary or terminal, on slender capillary pedicels .5 to 1.5 in. long, strict, spreading in fruit, much longer than calyx. *Sepals* lanceolate, hirsute or glabrous, .1 in. long. *Corolla* .3 in. long. *Capsule* orbicular .1 in. long. DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 692; Griff. Notul. IV. 122, and Ic. Pl. Asiat. t. 418, f. 4; Hook. f. Flor. Brit. Ind. IV. 281. *V. monnieroides*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Torenia hirta*, Cham. & Schlecht. Linnæa II. 571. *T. globosa*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Gratiola pusilla*, Willd. Sp. Pl. I. 105. *Columnea minuta*, Roxb. Flor. Ind. III. 98. *Tittmannia pusilla*, Benth. in Wall. Cat. 3945 partly. *T. sulcata*, Wight in Wall. Cat. 3946 partly. *Bonnaya VahlII*, G. Don Gen. Syst. IV. 538. *Stemodia minuta*, G. Don Gen. Syst. IV. 542. *Selago pusilla*, Thunb. Prod. Fl. Cap. 99.

MALACCA: *Griffith*! PROV. WELLESLEY: *King*! NEGRI SEMBILAN: Serembam, *Ridley* 10090! SINGAPORE: *King's Collector*! *Ridley*!—DISTRIB. S.E. Asia generally, Africa, Madagascar.

5. *VANDELLIA ELATA*, Benth. Scroph. Ind. 36. A slender, sub-erect or diffuse, glabrous or sparingly hirsute herb; stems simple or dichotomously branched, sometimes rooting near the base; branches slender, 6 to 8 in. long or longer. *Leaves* ovate, coarsely crenate-toothed, acute, base cuneate entire passing into the petiole; lamina .3 to .5 in. long, .25 to .3 in. wide; petiole .15 to .25 in. *Flowers* axillary or terminal, on slender capillary pedicels .3 to .5 in. long, strict, somewhat spreading in fruit, much longer than calyx. *Sepals* narrow-lanceolate, sparingly hirsute, .09 in. long. *Corolla* very small, pale blue, .1 in. long. *Capsule* broadly oblong, .12 in. long, as long as the fruiting sepals. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia elata*, Benth. in Wall. Cat. 3944.

SINGAPORE: *Ridley*!—DISTRIB. Tenasserim, Borneo.

6. *VANDELLIA PEDUNCULATA*, Benth. Scroph. Ind. 37. A slender glabrous herb, stem sometimes creeping at the base; branches slender, 4 to 10 in. long, prostrate. *Leaves* ovate, obtuse or sub-acute, obscurely crenate-toothed, .5 to 1 in. long, .4 in. wide, shortly petioled. *Flowers* axillary and in terminal racemes; pedicels slender 1.5 in. long, usually twice as long as leaves or longer. *Sepals* 5, narrowly lanceolate, free almost to the base, .25 in. long. *Corolla* white, or pale blue with a white spot. *Capsule* linear-lanceolate, .5 in. long. DC. Prod. X. 416;

Griff. Notul. IV. 120; Ic. Pl. Asiat. t. 418, f. 2; Hook. f. Flor. Brit. Ind. IV. 282. *V. Roxburghii*, G. Don Gen. Syst. IV. 549. *V. cordifolia*, G. Don. Gen. Syst. IV. 549. *Gratiola cordifolia*, Vahl Enum. I. 97; Don Prod. 85. *Bonnaya cordifolia*, Spreng. Syst. I. 42. *Tittmannia grandiflora*, Benth. in Wall. Cat. 3949. *Torenia diffusa*, Roxb. Fl. Ind. II. 95. *T. varians*, Griff. Notul. IV. 125 (not of Roxb.).

MALACCA: *Hervey!* SINGAPORE: *King's Collector!* *Thomson!* *Ridley!* JOHORE: *Ridley!* PERAK: *Wray!* *Scortechini!* *Ridley!* PENANG: *Curtis!*—DISTRIB. S.E. Asia generally.

### 8. ARTANEMA, Don.

Herbs with rather tall, erect, angled stems. *Leaves* opposite, entire or serrate, scabrid above as are the stem-angles. *Flowers* large, blue, pink or white, in terminal racemes; bracts leafy; bracteoles obsolete. *Calyx* 5-partite; lobes acuminate, smooth, much dilated. *Corolla* 2-lipped; upper lip outmost, erect, broad, emarginate; lower 3-lobed, spreading; throat not plicate; tube wide-cylindric. *Stamens* 4, didynamous; posterior pair short included, anterior pair long with arching filaments dilated at the base; anther-cells confluent at their tips. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose septicidal capsule; valves 2, separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species 3 to 4, in tropics of Eastern Hemisphere and Australia.

Leaves shortly petioled; flowers over .5 in. long .. 1. *A. sesamoides*.  
Leaves sessile, narrower; flowers under .5 in. long.. 2. *A. angustifolium*.

1. ARTANEMA SESAMOIDES, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* shortly petioled, lanceolate-acuminate, entire or serrate, 2 to 4 in. long, .75 to 1.25 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .3 to .5 in. long, usually slightly exceeding the calyx. *Calyx* of 5 sub-equal lobes, .25 to .3 in. long. *Corolla* blue, .75 in. long. *Capsule* globose, .3 in. in diam. DC. Prod. X. 408; Wight Ic. t. 1410; Miq. Flor. Ind. Bat. II. 686; Hook. f. Flor. Brit. Ind. IV. 274. *Columnnea longifolia*, Linn. Mant. 90. *Achimanes sesamoides*, Vahl Symb. II. 71. *Diceros longifolius*, Pers. Synops. II. 164; Bl. Bijdr. 751; Wall. Cat. 3884.

PENANG: Pulo Boutong, *Curtis!*—DISTRIB. S.E. Asia generally.

2. ARTANEMA ANGUSTIFOLIUM, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* sessile, lanceolate to linear-lanceolate, 3 to 4 in. long, .25 to .75 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .15 in. long, always shorter than the calyx. *Calyx* of 5 sub-equal sepals, .2 in. long. *Corolla* pale blue and white, or pink or white, .3 to .4 in.

long. *Capsule* globose, .2 in. in diam. DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Diceros angustifolius*, Wall. Cat. 3885.

PENANG: *J. Scott*! *Ridley* 9412! PERAK: *Scortechini*! *Wray* 2246! 2721! *King's Collector* 3045! PAHANG: *Ridley* 2165A! SINGAPORE: *Wallich* 3885! SELANGOR: *Sepang*, *Ridley* 7604! JOHORE: *Serom*, *Ridley* 11134!

Very nearly related to *A. sesamoides*, which differs chiefly by its larger blue flowers and larger capsules.

#### 9. CURANGA, JUSS.

Herbs, creeping or diffuse. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; bracts small, leafy; bracteoles 0. *Calyx* deeply 4-partite; upper and lower lobes very large, lateral small and narrow. *Corolla* 2-lipped; upper lip outmost, wide-arched, emarginate; lower longer, spreading, 3-lobed; tube short. *Stamens* 2, only the upper pair perfect, included, inserted on corolla-tube; anthers connate with divaricate cells; lower pair of stamens replaced by 2 clavate staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* an orbicular septicidal capsule, covered by the accrescent calyx-lobes, valves separating from the broad placentiferous septum. *Seeds* many, rugose.—DISTRIB. Species 2, S.E. Asiatic.

CURANGA AMARA, JUSS. Ann. Mus. IX. 320. An annual glabrous herb, with slender straggling divaricate branches, 2 to 3 feet long, rooting at the lower nodes. *Leaves* very bitter, ovate, crenate, obtuse or acute, base truncate rounded or cuneate, entire; blade 2 to 2.5 in. long, 1.5 to 2 in. wide; petiole very slender, .5 to .75 in. long. *Flowers* in short, few-flowered racemes, 2 to 2.5 in. long; pedicels .25 to .3 in., in fruit .5 in. long. *Calyx* with the outer sepals broadly ovate-cordate, membranous, reticulate, in flower .25 in., in fruit .5 in. long. *Corolla* brownish-red. *Capsule* small, compressed, .15 in. across. Benth. in DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Caranga amara*, Vahl Symb. I. 100. *Gratiola amara*, Roxb. Flor. Ind. I. 136. *Herpestis amara*, Benth. Scroph. Ind. 30. *Symphillium torenioides*, Griff. in Madr. Journ. Nat. Sc. IV. 1, t. 11. *Treisteria assamica*, Griff. Notul. IV. 111. Rumph. Herb. Amboin. V. t. 170, f. 1.

PERAK: *Scortechini* 499B! *Ridley* 9742! PAHANG: *Ridley* 1346! SELANGOR: *Ridley* 8214!—DISTRIB. East Himalaya, Indo-China, Malaya, Philippines.

#### 10. BONNAYA, Link & Otto.

Herbs, annual, glabrous. *Leaves* opposite, serrate or entire. *Flowers* solitary axillary, often passing into terminal racemes; bracteoles 0.

*Calyx* 5-partite; segments narrow, faintly imbricate. *Corolla* 2-lipped; upper lip outmost, erect, concave, 2-fid; lower larger, spreading, 3-lobed; tube cylindric. *Stamens* 2; upper pair alone perfect, sub-included; anthers contiguous, the cells divaricate; lower pair represented by 2 obtuse, glandular, entire staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a narrow, exserted, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose. —DISTRIB. Species about 10, in tropics of Eastern Hemisphere.

Leaves sharply, closely, deeply serrate :—

Leaves sessile; flowers white or pink; stems green .. 1. *B. brachiata*.

Leaves petioled; flowers purple; stems reddish .. 2. *B. reptans*.

Leaves remotely, shallowly serrate, or sub-entire; flowers violet-purple :—

Leaves narrow-oblong .. .. 3. *B. veronicaefolia*.

Leaves lanceolate .. .. { 3b. *veronicaefolia*,  
VAR. *verbenæfolia*.

1. BONNAYA BRACHIATA, Link & Otto, Ic. Pl. Sel. I. 25, t. 11. An erect rather rigid herb, 4 to 10 in. high; branches diffuse divaricate, the lowest decumbent below. *Leaves* oblong, obtuse or acute, margins thickened and sharply closely deeply serrate with teeth mucronate; lamina .5 to 1.5 in. long; pedicels rigid about .25 in long; bracts small. *Calyx* of 5 nearly free sepals .25 in. long. *Corolla* white or pink, .25 in. long. *Capsule* slender, spreading or erect, .5 to .6 in. long. Benth. in Wall. Cat. 3855, Scroph. Ind. 32, and DC. Prod. X. 420; Miq. Flor. Ind. Bat. II. 695; Hook. f. Flor. Brit. Ind. IV. 284. *B. serrata*, Griff. Notul. IV. 108. *B. pusilla*, Benth. Scroph. Ind. 33; Wall. Cat. 3861. *Gratiola serrata*, Roxb. Flor. Ind. I. 139, and ed. Carey & Wall. I. 140. Rheede, Hort. Malab. IX. t. 59.

SINGAPORE: Wallich! PAHANG: Ridley!—DISTRIB. India, Indo-China, China, Malaya, Philippines.

Wallich's Singapore specimen and one of Ridley's from Pahang belong to the form distinguished by Bentham as *B. pusilla*; another Pahang gathering (Ridley 2163) consists of genuine *B. brachiata*, from which, however, *B. pusilla*, though separable as a marked form, is hardly separable as a variety.

2. BONNAYA REPTANS, Spreng. Syst. I. 41. A prostrate creeping slender herb with reddish stem, branches and leaves beneath; branches diffuse spreading often 12 in. long. *Leaves* in distant pairs, obovate-oblong, obtuse, margins thickened and sharply serrate with mucronate teeth; base narrow-cuneate passing into a petiole .25 in. long; blade .75 to 1.25 in. long, .5 in. wide. *Flowers* opposite in terminal racemes sometimes 3 to 4 in. long; pedicels rigid, .25 in. long; bracts small.

*Calyx* of 5 nearly equal sepals, .3 in. long. *Corolla* purple, .75 in. long. *Capsule* very slender, spreading, 1 in. long. Benth. in DC. Prod. X. 420; Wall. Cat. 3856; Hook. f. Flor. Brit. Ind. IV. 284. *B. ruelloides*, Spreng. Syst. I. 41. *B. ciliata*, Spreng. Syst. I. 41. *Gratiola ciliata*, Koenig in Vahl Symb. I. 97. *G. ruelloides*, Koenig in Vahl Symb. I. 99. *G. reptans*, Roxb. Flor. Ind. I. 140. *Henckelia Roxburghiana*, Dietr. Sp. Pl. I. 572.

PENANG: *Curtis*! PERAK: *Scortechini*! WRAY! PROVINCE WELLESLEY: *Ridley* 6985! PAHANG: *Ridley*! SINGAPORE: *Hullett*! *Ridley*!—DISTRIB. E. Himalaya, India, Indo-China, Malaya, Philippines.

3. BONNAYA VERONICÆFOLIA, Spreng. Syst. I. 41. A flaccid decumbent or creeping herb, with ascending branches 4 to 8 in. long. *Leaves* sub-sessile or narrowed into a short petiole, oblong or oblong-lanceolate or obovate, or lanceolate, obtuse or acute, margin distantly serrate or sub-serrate or sub-entire. *Flowers* opposite, in terminal leafy or naked racemes sometimes up to 6 in. long usually much shorter, pedicels rather flaccid, .25 in. to .35 in. long; bracts leafy or small. *Calyx* of 5 nearly equal sepals .2 in. long. *Corolla* violet-purple, .25 to .35 in. long. *Capsule* slender, sub-erect or spreading, .5 to .6 in. long.

VAR. *typica*. *Leaves* usually obtuse, sometimes acute, always distantly serrate, 1 to 2 in. long, .5 in. wide; racemes usually with leafy bracts; *corolla* .25 in. long. *B. veronicæfolia*, Wall. Cat. 3857; Benth. in DC. Prod. X. 421; Wight Ic. t. 1411; Miq. Flor. Ind. Bat. II. 696; Hook. f. Flor. Brit. Ind. IV. 285. *B. marginata*, Spreng. Syst. I. 41. *B. rigida*, Benth. in Wall. Cat. 3859. *B. procumbens*, Benth. in Wall. Cat. 3860. *B. Rothii*, Dietr. Sp. Pl. I. 556. *B. bracteata*, Griff. Notul. IV. 107. *Gratiola veronicæfolia*, Retz Obs. IV. 8; Roxb. Pl. Corom. II. 30, t. 154; Fl. Ind. I. 138; ed. Carey & Wall. I. 139. *G. marginata*, Colsm. in Vahl Enum. I. 98. *G. racemosa*, Roth Nov. Sp. 9.

PENANG: Balli Pulo, George Town, &c. *Deschamps*! SINGAPORE: *King's Collector*! PAHANG: *Ridley*! MALACCA: *Hervey*! SELANGOR: *Ridley*! JOHORE: Serom, *Ridley*!—DISTRIB. Throughout S.E. Asia.

VAR. *verbenæfolia*, Hook. f. Flor. Brit. Ind. IV. 285. *Leaves* acute or sub-acute, distantly shallowly serrate or sub-entire, 1 to 1.5 in. long, .2 to .25 in. wide; racemes usually marked with minute bracts; *corolla* .35 in. long. *B. verbenæfolia*, Benth. in DC. Prod. X. 421; Wall. Cat. 3858; Wight, Ic. t. 1412. *B. Roxburghiana*, Dietr. Sp. Pl. I. 559. *B. cyanea*, Griff. Notul. IV. 107. *Gratiola verbenæfolia*, Colsm. in Vahl Enum. I. 96. *G. ciliata*, Colsm. in Vahl Enum. I. 97. *G. racemosa*, Roxb. Fl. Ind. I. 138, and ed. Carey & Wall. I. 139. *G.*

*Roxburghiana*, Roem. & Schult. Syst. I. 123. *Tittmannia Colsmanni*, Benth. in Wall. Cat. 3950. *Torenia gracilis*, Benth. in Wall. Cat. 3952.

MALACCA: *Hervey*! PENANG: *Curtis*! PERAK: *Ridley*! *Scortechini*!—DISTRIB. Throughout S.E. Asia.

## 11. SCOPARIA, Linn.

Undershrubs or herbs with twiggy branches. *Leaves* opposite or whorled, glabrous or pubescent, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or 2-nate; bracteoles 0. *Calyx* small, 4-5-partite; lobes imbricate. *Corolla* small, rotate, 4-lobed; lobes imbricate, sub-equal, obtuse; throat densely bearded; tube very short. *Stamens* 4, sub-equal; filaments filiform; anthers sub-sagittate, cells diverging or parallel, discrete. *Ovary* 2-celled; ovules in each cell numerous; style sub-clavate; stigma truncate or emarginate. *Fruit* a small, ovoid or globose, septicidal capsule; valves membranous, with inflexed margins, separating from the placentiferous septum. *Seeds* many, small, obovoid, angular, scrobiculate.—DISTRIB. Species about 6, all American.

SCOPARIA DULCIS, Linn. Sp. Pl. 116. A glabrous much-branched erect or ascending leafy undershrub with a strong perennial woody rootstock; stems 6 in. to 3 ft. high. *Leaves* opposite or ternate, lanceolate or elliptic-lanceolate, 1 to 2 in. long, .5 to 1.5 in. wide, serrate, acute or obtuse, narrowed to a short petiole. *Flowers* many minute in terminal panicles; pedicles slender, strict, .25 to .4 in. long. *Sepals* 4, oblong. *Corolla* white, .12 in. in diam., tube very short. *Stamens* sub-equal. *Capsule* globose, .15 in. in diam. Voigt Hort. Suburb. Calcutt. 507; Benth. in DC. Prod. X. 431; Gaertn. Fruct. I. 251, t. 53, f. 10; Miq. Flor. Ind. Bat. II. 699; Hook. f. Flor. Brit. Ind. IV. 289.

PENANG: Kampai, Batu Gaja, &c., *King*! *Deschamps*! *Curtis*! SELANGOR: *Ridley*! PERAK: *Scortechini*! SINGAPORE: *Hullett*! *Kurz*! *King's Collector*! *Deschamps*!—DISTRIB. Everywhere in the tropics; originally American.

## 12. STRIGA, Lour.

Herbs, semiparasitic on roots, usually scabrid, discoloured when dry. *Leaves* opposite below, alternate above, linear, entire or rarely toothed sometimes reduced to scales. *Flowers* axillary, or the upper in bracteate spikes; bracteoles usually 2. *Calyx* 5-toothed or 5-fid, 5- or 10- or 15-ribbed, tubular. *Corolla* 2-lipped; upper lip inner in bud,



usually shortly 2-fid or emarginate, lower 3-lobed; limb spreading; tube slender abruptly incurved at or above the middle. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse; connective sometimes mucronate. *Ovary* 2-celled; ovules in each cell numerous; style thickened upwards; stigma entire. *Fruit* an oblong or globose loculicidal capsule; valves entire, firm, septiferous, separating from the placentas. *Seeds* many, small, ovoid or oblong, reticulated.—**DISTRIB.** Species 20, in the tropics of the Eastern Hemisphere.

*STRIGA LUTEA*, Lour. Flor. Cochin-Chin. 22. A slender, erect, simple or fastigiately branched herb, 6 to 18 in. high; leaves and stems scabrid or villous. *Leaves* linear, .5 to 1.5 in. long, .12 in. wide. *Flowers* in elongated, usually interrupted spikes, 2 to 6 in. long; bracts usually exceeding the calyx, linear-lanceolate, scabrid. *Calyx* 10-ribbed, .25 in. long, teeth 5, sub-equal. *Corolla* white or yellow or pink or purple, .5 in. long, glabrous, incurved; upper lip emarginate reflexed; lower lip 3-lobed spreading. *Capsule* oblong, grooved, shorter than the calyx. Benth. in Hook. Comp. Bot. Mag. I. 363; Hook. f. Flor. Brit. Ind. IV. 299. *S. hirsuta*, Benth. in DC. Prod. X. 502; Dalz. & Gibs. Bomb. Flor. 181. *S. coccinea*, Benth. in DC. Prod. X. 364. *S. phœnicea*, Benth. in DC. Prod. X. 364. *Buchnera asiatica*, Linn. Sp. Pl. 630 partly; Roxb. Fl. Ind. III. 31; Benth. Scroph. Ind. 40. *B. coccinea*, Benth. Scroph. Ind. 40, Wall. Cat. 3870. *B. phœnicea*, Benth. Scroph. Ind. 40; Wall. Cat. 3874. *Campuleia coccinea*, Hook. Flor. Exot. t. 203. Rheede Hort. Malab. IX. t. 66.

**PENANG:** *Curtis* 1840! **PAHANG:** *Ridley*! **SINGAPORE:** *Ridley* 139; *Kurz*! **ANDAMANS:** Port Blair, *King*! *Prain*!—**DISTRIB.** Throughout S.E. Asia, Arabia, Madagascar, Africa.

### 13. CENTRANTHERA, R. Br.

Herbs, semiparasitic, annual, rigid, scabrous. *Leaves* opposite throughout, or opposite below alternate above, oblong or linear, obtuse, entire or toothed. *Flowers* axillary, or in bracteate spikes or racemes; bracteoles 2. *Calyx* compressed, spathaceous, split on one side, acuminate entire, or shortly 3-5-lobed on the other. *Corolla* 5-lobed; lobes sub-equal, spreading, the 2 upper inmost in bud; limb oblique; tube long, incurved. *Stamens* 4, didynamous, included; anthers contiguous in pairs; cells transverse, spurred or mucronate at base, one cell often sterile. *Ovary* 2-celled; ovules in each cell numerous; style simple, dilated above; stigma acute, linguiform. *Fruit* an ovoid or sub-globose loculicidal capsule; valves entire, carrying away the

placentas. *Seeds* many, small, oblong-cuneate; testa lax, reticulate.—  
DISTRIB. Species 4–5, E. Asiatic and Australian.

CENTRANTHERA HUMIFUSA, Wall. Cat. 3883. A dwarf herb, diffusely branching from the base, hispid or glabrous, branches 3 to 6 in. long. *Leaves* linear, entire, .5 to .75 in. long. *Flowers* in terminal spikes, sub-sessile; bracts small. *Calyx* ovoid, sub-acute, .15 in. long. *Corolla* yellow, .3 to .5 in. long, incurved. *Capsule* sub-globose, .15 in. wide. Benth. in DC. Prod. X. 525; Hook. f. Flor. Brit. Ind. IV. 301. *Razumovia tranquebarica*, Spreng. Syst. II. 812. *Torenia lepidota*, Roth Nov. Sp. 281.

MALACCA: Griffith! SINGAPORE: Kurz!—DISTRIB. China, Indo-China, India, Malaya.

#### Order LXXXIV. OROBANCHACEÆ.

[By D. PRAIN.]

Root-parasites, annual, white or reddish. *Stem* simple or branched, stout or slender, clothed with leaf-scales. *Leaves* proper 0. *Flowers* solitary or in spikes or racemes, irregular. *Sepals* 4–5, usually connate in a variously toothed or spathaceous calyx, rarely free. *Corolla* hypogynous, 2-lipped; upper lip vaulted, lower lip 3-lobed; throat often with 2 villous folds; tube curved. *Stamens* 4, didynamous, inserted on corolla-tube; anthers 1–2-celled; cells spurred at the base, dehiscence by slits or basal pores; one cell sometimes imperfect. *Disk* unilateral or glandular or obsolete. *Ovary* of 2 connate carpels, usually 1-celled; style long, tip curved; stigma 2-lobed, sub-capitate; ovules usually numerous on generally 2 pairs of free or confluent parietal placentas which sometimes meet in the axis of the ovary. *Capsule* 1-celled, 2-valved; *seeds* usually many, minute, with a pitted or tubercled, rarely reticulate and lax testa; albumen fleshy; embryo ovoid, entire or 2-fid.

#### ÆGINETIA, Linn.

Leafless parasitic herbs with simple or branched naked or scaly stems or scapes. *Flowers* few, large, solitary or corymbose; bracteoles 0. *Calyx* spathaceous, split in front almost to the base. *Corolla* incurved, campanulate-tubular; limb obscurely 2-lipped, lobes somewhat spreading, the two upper lobes (upper-lip) connate. *Stamens* included; anthers with one perfect cell adnate to filament and not spurred; the other cell absent in upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the chamber, ovuliferous throughout; style slender;

stigma large peltate. *Capsule* partially 2-valved. *Seeds* many, small, crowded; testa pitted.—**DISTRIB.** Species 3, S.E. Asiatic.

*ÆGINETIA PEDUNCULATA*, Wall. Pl. As. Rar. III. 13, t. 219. A leafless herb, 3 to 6 in. high; stems red or yellow, parasitic on roots, buried, emitting several short stout fleshy several-flowered scapes with alternate peduncled flowers; peduncles 1 to 4 in. long, stout, bracteate at base; bracts .25 to .35 in., ovate, obtuse. *Calyx* 1.5 to 2 in. long, fleshy, dull-pink at length yellowish-white, with a mucilaginous pad surrounding base of corolla, tip acute or obtuse. *Corolla-tube* yellow or white, the lobes violet or claret-coloured, crenate and erose. *Stamens* didynamous, anthers of lower pair with a large dorsal fleshy decurved horn. *Ovary* 1-celled, placentas 2, each of 2 plates; stigma cordate-peltate. *Capsule* ovoid. *Seeds* brown. Reut. in DC. Prod. XI. 43; Wight Ill. t. 158B, f. 6; Ic. t. 1421; Hook. f. Flor. Brit. Ind. IV. 320. *Æ. abbreviata*, Ham. in Wall. Cat. 3965; Benth. Scroph. Ind. 95; Reut. in DC. Prod. XI. 43. *Æ. acaulis*, Walp. Rep. III. 481; Reut. in DC. Prod. XI. 43. *Orobanche pedunculata*, Roxb. Hort. Beng. 45; Fl. Ind. iii. 29. *O. acaulis*, Roxb. Cor. Pl. III. 89, t. 292, and Fl. Ind. III. 29.

PERAK: Batang Padang Valley, 2,000 feet; Wray 1456! 1457!—**DISTRIB.** India, Indo-China, Java, Sumatra.

One of Wray's specimens is attached to the rhizome of a *Kæmpferia*.

#### CHRISTISONIA, Gardn.

Low fleshy scaly parasitic herbs, with yellow or white or rose-purple flowers; *stems* simple or tufted from a short or long rootstock; *scales* alternate, obtuse or acute. *Flowers* densely or laxly corymbose; bracteoles 2 or 0. *Calyx* tubular, terete or angular, 2-5-lobed or -toothed. *Corolla-tube* long, inflated or funnel-shaped, slightly or distinctly curved, 5-lobed, obscurely to distinctly 2-lipped, the two upper lobes (in our species outer in bud) sub-erect, the lower spreading. *Stamens* 4, included or sub-exserted; filaments stout; anthers with one perfect cell and one imperfect, one pair sometimes spurred or appendaged; rarely with both cells perfect. *Disk* 0. *Ovary* 1-celled with two 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large, 2-lobed, the upper lobe very small or obsolete, the lower (sometimes the only one present) very large orbicular or clavate; ovules numerous. *Capsule* ovoid or sub-globose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—**DISTRIB.** Species 12, tropical Asiatic.

CHRISTISONIA SCORTECHINII, Prain in Journ. As. Soc. Beng. LXXIII. 2. 205. *Stem* short hypogæal, covered with linear scales. *Flowers* 3 to 8, crowded in a dense corymb; some shortly peduncled, others sessile, each with an oblong cucullate basal bract .75 in. long; all parts loaded with sticky mucilage. *Calyx* spathaceous, rupturing into usually 2 (sometimes, *fide* Scortechini, into 2 to 4) lobes, in the fully opened flower with tube 1 in., lobes .25 in. long. *Corolla-tube* white, with a yellow line inside in front, 2 in. long, infundibuliform and curved above, the lower part narrow-cylindric 1 in. long; limb 2-labiate, upper lip outmost in bud, erect, 2-lobed, lower lip 3-lobed, spreading. *Stamens* didynamous; anthers all conniving; filaments glabrous, inserted below middle of corolla-tube, 1-celled, adnate to the enlarged filament, upper pair without, lower with an empty oblong pointed cell. *Disk* 0. *Ovary* glabrous, 1-celled, placentas 2, 2-fid, uniformly covered with ovules; style glabrous downwards; stigma peltate, flat, .2 in. in diam.

PERAK: *Scortechini*, 2121!

#### Order LXXXV. LENTIBULARIACEÆ.

[By D. PRAIN.]

Marsh or aquatic herbs, or occasionally growing on wet rocks. *Leaves* radical, rosulate or when submerged capillary-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, on 1-many-flowered simple or branched scapes; bracts small, sometimes 0; bracteoles under calyx 2 or 0. *Calyx* inferior, 2-5-lobed. *Corolla* 2-lipped and spurred; upper lip usually the smaller, entire or emarginate; lower lip 3-6-lobed. *Stamens* 2, adnate to the base of the corolla, alternate with the lobes of the lower lip; filaments widely curving, anther-cells ovate, transversely confluent; dehiscence longitudinal. *Carpels* 2, connate in a superior, globose, 1-celled ovary; ovules very many, on a free basal placenta; style short; stigma unequally 2-lobed. *Fruit* a globose 2-4-valved, or irregularly rupturing capsule. *Seeds* very many, minute; albumen 0.—DISTRIB. Species nearly 200, in all parts of the world.

#### UTRICULARIA, Linn.

Herbs, often very small, submerged or floating, or growing on wet rocks. *Leaves* in submerged or floating species multifid, with capillary segments, in erect or twining species entire, often disappearing at time of flowering, frequently with minute bladders. *Flowers* on simple or branched scapes, racemes few- or many-flowered; bracts and 2 bracteoles

distinct. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped; upper lip entire or emarginate; lower larger 3-6-lobed; tube with a straight or curved spur. *Stamens* 2, adnate to base of corolla, alternate with lobes of lower lip; filaments broad; anthers ovate, 2-celled, or by confluence almost 1-celled. *Carpels* connate in a globose 1-celled ovary; ovules many, on a central placenta; style short; stigma unequally 2-lobed. *Capsule* globose, regularly 2-4-valved, or opening irregularly. *Seeds* many, small; albumen 0.—**DISTRIB.** Species 150, in most countries.

Leaves many, submerged, scattered, divided into numerous capillary segments mostly interspersed with bladders; calyx-lobes equal or nearly so; pedicels not winged:—

Flowers yellow to pale-yellow or nearly white:—

Peduncles very slender; flowers usually two, never more than three, always under .25 in. across; pedicels in fruit erect: sometimes the capillary leaves absent .. .. 1. *U. exoleta*.

Peduncles stout; flowers usually more than three, and always from .35 to .5 in. across; pedicels reflexed in fruit and thickened under the calyx .. .. 2. *U. flexuosa*.

Flowers blue or red or pink; pedicels erect in fruit .. .. 3. *U. punctata*.

Leaves few, rosulate at base of stem:—

Leaves linear or linear-spathulate, usually absent at time of flowering; calyx-lobes equal or nearly so; seeds not glochidiate:—

Scales of the scape and bracts attached by their bases:—

Stems erect:—

Flowers yellow; pedicels in fruit distinctly winged .. 4. *U. bifida*.

Flowers pink, purple, or violet, rarely white with lilac markings:—

Pedicels in fruit slightly winged; sometimes a few leaves still present at time of flowering; stems 8 to 12 in. high, stoutish .. .. 5. *U. affinis*  
VAR. *Griffithii*.

Pedicels in fruit capillary, short, wingless; leaves 0 at time of flowering; stems 2 to 3 in. high, very slender .. .. 6. *U. minutissima*.

Stems twining; flowers yellow:—

Stems slender, leaves absent at time of flowering; lower lip less than .25 in. wide .. .. 7. *U. Wallichiana*.

Stems stouter; leaves forming matted masses; lower lip over .3 in. wide .. .. 8. *U. involvens*.

Scales of the scape and bracts produced downward below point of attachment:—

Flowers on distinct pedicels as long as the fruiting calyx or longer; capsule longer than fruiting calyx-lobes; flowers pink (*Ridley*) .. .. 9. *U. verticillata*.

Flowers almost or quite sessile; capsule hidden by the fruiting calyx-lobes:—

Flowers few, scattered on the very slender scapes; corolla white .. .. 10. *U. racemosa*  
VAR. *filicaulis*.

Flowers many or few, congested at the ends of the  
stouter rigid scapes and branches; corolla rarely pure  
white .. .. . 11. *U. ophirensis*.

Leaves orbicular or spatulate-orbicular, persistent; calyx-lobes  
very unequal, the upper the larger; seeds glochidiate; stems  
very slender, lip pale-violet or white with a yellow centre .. 12. *U. orbiculata*.

1. *UTRICULARIA EXOLETA*, R. Br. Prod. 430. A water-weed, sometimes floating with very slender stems and submerged divided capillary leaves, the segments interspersed with bladders; sometimes growing in mud with capillary leaves absent and with tufted setaceous leaves. *Scapes* slender, naked, or with one or two scale-like bracts, 2 to 4 in. long, usually 2-flowered, occasionally 3-flowered, sometimes 1-flowered, then often with an abortive axis or flower-bud opposite the bract; pedicels slender, erect, the lowest ultimately 4 in. long; bracts very small, obtuse, basifixed; bracteoles 0. *Calyx* 2-lobed; lobes slightly unequal, ovate-obtuse or sub-orbicular, in fruit adpressed to the capsule, 1 in. long. *Corolla* yellow, 2 in. across; spur cylindric-conical, twice as long as lower calyx-lobe and slightly exceeding lower lip of corolla, which has an entire margin and embraces the base of the spur. *Capsule* almost globose, 15 in. in diam. *Seeds* sub-trapezoid-discoid, margin thin, spreading, minutely crenulate. A. DC. Prod. VIII. 7; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. diantha*, Roem. & Schult. Syst. Veg. I. 169; Wight Ic. t. 1569; Oliv. Journ. Linn. Soc. III. 175. *U. diflora*, Roxb. Hort. Beng. 4. *U. biflora*, Roxb. Fl. Ind. I. 143, nec alior. *U. Roxburghii*, Spreng. Syst. I. 52. *U. elegans*, Wall. Cat. 1502. *U. pterosperma*, Edgew. Proc. Linn. Soc. I. 352.

PERAK: Sunga Ryah, *King's Collector* 891! 4383! *Ridley*! SINGAPORE: *Ridley*. PROV. WELLESLEY: *Ridley*! JOHORE: Parit Lombong, *Ridley*! PAHANG: Kwala Pahang, *Ridley*! NICOBARS: Kamorta, *Kurz*! —DISTRIB. S.E. Asia, N. Australia.

2. *UTRICULARIA FLEXUOSA*, Vahl Enum. I. 198. A floating water-weed with submerged divided capillary leaves, the segments interspersed with bladders; occasionally with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, scattered or sometimes whorled near or occasionally above the base of the scapes. *Scapes* 3 to 10 in. long, 3-12-flowered; pedicels stout, reflexed, and slightly thickened under the calyx in fruit, ultimately 3 to 5 in. long; bracts ovate-acute, basifixed; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-sub-acute, in fruit patent, 25 in. long. *Corolla* yellow, rarely white, 3 to 5 in. across; spur somewhat longer than lower calyx-lobe, and about as long as lower lip of corolla, stoutish, bluntish, straight or somewhat curved. *Capsule* compressed, sub-globose, 25 in.

long. *Seeds* thickly discoid, margin thin, incurved towards the concave face, usually 5-6-angled. Bl. Bijdr. 739; A. DC. Prod. VIII. 24; Oliv. Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. australis*, R. Br. Prod. 430; A. DC. Prod. VIII. 6. *U. fasciculata*, Roxb. Fl. Ind. I. 143; Wall. Cat. 1499; A. DC. Prod. VIII. 7; Wight Ic. t. 1568; Miq. Flor. Ind. Bat. Suppl. 246. *U. confervifolia*, Don Prod. 84; A. DC. Prod. VIII. 8. *U. inæqualis*, Benj. Linnæa XX. 304. *U. Blumei*, Miq. Fl. Ind. Bat. II. 994. *U. extensa*, Hance in Walp. Ann. III. 3.

MALACCA: *Ridley*! PAHANG: Kwala Pahang, *Ridley*! PERAK: *Scortechini*! Durian S. Batang, *King's Collector* 1036! SINGAPORE: *Ridley* 5642, 9844! KEDAH: Langkawi, *Curtis*!—DISTRIB. S.E. Asia, N. Australia.

*Forma gracilis*, Oliv. Journ. Linn. Soc. III. 175 (= *U. inæqualis*, Benj.) more slender in all its parts and with smaller paler yellow flowers.

SINGAPORE: *King's Collector* 1165! *Hullett* 36! 385! MALACCA: *Cuming*! *Goodenough* 1407! *Ridley*! PROV. WELLESLEY: *Ridley*!

The very similar and nearly allied *U. stellaris*, distinguished most easily by the presence of a cluster of oblong vesicles about the middle of the peduncle, has not been reported so far from the Malayan Peninsula.

*King's Collector's* field-note on the slender form, which the writer agrees with Oliver in considering no more than a form of *U. flexuosa*, is as follows: "Herbaceous plant, in clear pools of fresh water; colour bright green. Flowers pale yellow. I sent a similar one from Durian S. Batang, but I don't think the same." His field-note on genuine *U. flexuosa* is as follows: "Growing in muddy pools of water; colour a dark reddish-brown, tinged with green; flower bright yellow."

In his interesting paper on the *Utricularias* of the Malay Peninsula (*Journ. Bot.* for 1895, pp. 10, 11) Mr. Ridley gives as localities for *U. flexuosa* Pahang and Kedah, Langkawi, but does not differentiate the two forms. The leaves, he remarks, are used in medicine by the Malays, who call it Lumut Ekor Kuching (Cat's Tail Moss) or Lumut Ekor Kuning (Yellow Tail Moss).

3. *UTRICULARIA PUNCTATA*, Wall. Cat. 2121. A floating waterweed, with submerged divided capillary leaves, the segments interspersed with bladders, often with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, near the base of the scapes. *Scapes* 4 to 12 in., usually many-flowered; pedicels slender, ascending or sub-erect in fruit, ultimately .5 to .6 in. long; bracts ovate, more or less acute, slightly produced beyond base; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-rotund, obtuse, .1 in. long. *Corolla* blue, reddish-purple or pink, .25 in. across, spur somewhat longer than lower calyx-lobe, shorter than lower lip of corolla, thick, sub-cylindric, obtuse. *Capsule* thin, ovate-oblong, obtuse, .2 in. long. *Seeds* discoid, peltate,

margin winged throughout, wing deeply, sharply toothed. A. DC. Prod. VIII. 5; Wight Ic. t. 1570; Oliv. in Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10.

PAHANG: Chenei Lake, *Fox*!—DISTRIB. Borneo, Tenasserim.

4. *UTRICULARIA BIFIDA*, Linn. Sp. Pl. 26. A slender erect weed of wet places; leaves radical, linear-spathulate, disappearing before flowering, .3 to .5 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 2 to 10 in. long, 2-many-flowered, beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, in flower .12 in., in fruit .2 in. long, recurved and distinctly winged from the decurrent calyx, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate-obtuse, .25 in. long. *Corolla* yellow, .25 in. wide; spur longer than the lower calyx-lobe and as long as the lower lip of the corolla, slightly falcate. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, testa lax, scrobiculate, obliquely striate. A. DC. Prod. VIII. 21; Oliv. Journ. Linn. Soc. III. 182; Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 10. *U. biflora*, Wall. Cat. 1498 (*not of* Roxb.). *U. diantha*, A. DC. Prod. VIII. 21 (*not of* Roem. & Schult.). *U. Wallichiana*, Benj. Bot. Zeit. 1845 214 (*not of* Wight). *U. brevicaulis*, Benj. Linnæa XX. 303.

PENANG: *Curtis*! SELANGOR: *Ridley*! PERAK: Larut, *Scortechini*! Selama, growing among grass in swampy places, *Wray* 4263! *Ridley*! PROV. WELLESLEY: in wet and swampy places, *King's Collector* 1616! SINGAPORE: in wet, sandy hollows, *Kurz* 2973! *Ridley*! MALACCA: *Griffith*! *Hervey*! *Ridley*! PAHANG: Kwala Pahang, *Ridley* 1481! KEDAH: *Curtis*.—DISTRIB. Throughout E. and S.E. Asia.

Mr. Ridley has seen specimens of this species from the Dindings and from Penang, also from Kedah, Langkawi. He finds two rather distinct forms, a small-flowered, plain yellow one and a form with larger flowers over .25 in. long with a darker orange centre; this latter Ridley found in Pahang growing with the common form.

5. *UTRICULARIA AFFINIS*, Wight; var. *Griffithii*, Oliv. Journ. Linn. Soc. III. 179. A slender erect weed of wet places. *Leaves* radical, linear or linear-spathulate, obtuse, very often persisting during flowering, .5 to .7 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 5 to 12 in. long, usually many-flowered; beset with a few basified ovate-acute scales or empty bracts; pedicels short, .1 in. long in flower, in fruit .15 in. long and slightly winged by the decurrent calyx, erect or ascending, never recurved and rarely patent, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate or sub-orbicular, acute or sub-cuspidate, .25 in. long. *Corolla* blue with whitish lines, .25 in. wide; spur slightly longer than the lower calyx-



lobe and the lower lip of the corolla. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, reticulate, cells of the testa sub-hexagonal. *U. Griffithii*, Wight Ic. t. 1576; Ridl. Journ. Bot. XXXIII. 10. *U. cœrulea*, Benth. Fl. Hongk. 256 (not of Linn.).

MALACCA: *Griffith*! RIDLEY! PERAK: *Scortechini*! SINGAPORE: *Hullett*! RIDLEY!—DISTRIB. China, Burma, Tenasserim, Borneo.

There are only shrivelled leaves on Ridley's and Wight's specimens, which are mostly in fruit; Scortechini's specimens, which are in flower, have numerous radical grassy linear-spathulate obtuse leaves, .5 in. long or rather longer. Mr. Ridley, in all probability rightly, considers that this is entitled to specific rank apart from *U. affinis*.

6. *UTRICULARIA MINUTISSIMA*, Vahl Enum. I. 204. A very small erect weed of wet places; leaves 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* capillary, rigid, branched, 2 to 3 in. long, quite glabrous, or with a few rigid scattered black hairs; racemes 2-5-flowered, beset with a few basifixed ovate-acute empty bracts or scales; pedicels very short, in fruit only .05 in. long, occasionally like the upper calyx-lobe with a few straight black hairs, sub-patent, with small lanceolate basifixed bracts and bracteoles, less than half as long as their pedicels. *Calyx* 2-lobed, lobes sub-equal wide-oblong, obtuse, in fruit .1 in. long. *Corolla* mauve, .15 in. wide; spur wide-conic-cylindric, thrice as long as lower calyx-lobe and twice as long as lower lip of corolla. *Capsule* oblong, .07 in. long, covered by the calyx. *Seeds* minute, ovoid, obscurely scrobiculate. A. DC. Prod. VIII. 16; Oliv. Journ. Linn. Soc. III. 190; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11.

PERAK: Larut, *Scortechini* 1501! PAHANG: Kwala Pahang, *Ridley* 1474c in part! MALACCA: *Koenig*; on Mount Ophir, *Ridley*.

This small plant, collected by Scortechini with no note of colour, and stated by Ridley to have mauve flowers, is here identified with *U. minutissima*, Vahl, from description only. The branched capillary stems render it very like and very liable to be mistaken for small specimens of *U. verticillata*, which has, however, longer pedicels and bracts produced below their point of insertion. The presence of hairs on the stems, pedicels, and sometimes the calyx, at once suggests a reference to *U. hirta*, which is undoubtedly its nearest affinity. The scape, however, appears never to branch in *U. hirta*; the flowers in that species are larger and fewer; the pubescence, too, when present in *U. minutissima*, which is not always the case, is very different, consisting of rigid patent black bristly hairs, whereas in *U. hirta* the hairs are soft and grey or tawny. The seeds of the two species are very similar, but those of *U. minutissima* are smaller and yet have fewer- and larger-meshed sub-hexagonal reticulations.

7. *UTRICULARIA WALLICHIANA*, Wight Ic. t. 1572, fig. 1. A very slender herb growing in wettish fields and damp grassy places; stems

twining, thin, 6 to 8 in. long. *Leaves* linear-spathulate, absent at time of flowering; bladders not seen. *Flowers* small, racemose or subspicate at ends of stems; pedicels sometimes absent, sometimes up to .25 in. long; bracts lanceolate, acute, basifixed. *Calyx-lobes* ovate, acute, .15 in. long, in fruit .2 in. long. *Corolla* yellow; upper lip obovate, lower rounded, .2 in. wide; spur straight or slightly incurved, .2 in. long. *Capsule* sub-globose, enclosed within calyx-lobes, upraised on the sub-erect fruiting pedicels. *Seeds* ellipsoid, scrobiculate but not glochidiate or papillose. Oliv. in Journ. Linn. Soc. III. 182; Clarke in Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 11. *U. scandens*, Benj. in Linnæa XX. 309 chiefly. *U. macrolepis*, Wight Ic. t. 1580, fig. 2. *U. capillacea*, Thw. Enum. 171 (not of Oliv.).

MALACCA: Mount Ophir, at 4,000 feet elevation, growing among grasses, *Ridley*!—DISTRIB. Throughout India.

8. *UTRICULARIA INVOLVENS*, Ridl. Journ. Bot. XXXIII. 11. A tufted herb forming mats of leaves on rocks in streams; stems twining, fairly stout, 12 in. long. *Leaves* thinly membranous, spathulate-linear, obtuse, 1 in. long or longer, .1 in. across. *Flowers* large, racemed at ends of stems; pedicels .5 to .75 in. long; bracts lanceolate, acute, basifixed, .1 in. long. *Calyx-lobes* oblong-ovate, .25 in. long. *Corolla* lemon-yellow; upper lip obovate, lower rounded, 2-lobed, .35 in. wide; spur straight, pendulous, acute or acuminate, .25 in. long. *Capsule* unknown.

KEDAH: Kedah Peak (Gunong Jerai), at 3,000 feet elevation, in streams and wet places, *Ridley*!

A very fine and remarkably distinct species.

9. *UTRICULARIA VERTICILLATA*, Benj. Linnæa XX. 312. A slender erect weed of wet places. *Leaves* 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* slender, sometimes capillary, rigid, branched, 3 to 10 in. long, glabrous; beset with a few ovate scales or empty bracts, acute at both ends and produced downwards beyond point of insertion; pedicels capillary, puberulous, .2 in. long in flower, in fruit .25 in. long; bracts and bracteoles produced below point of insertion. *Calyx* 2-lobed, lobes sub-equal, sub-orbicular, in fruit .1 in. long. *Corolla* (? yellow) .15 in. wide; spur wide-cylindric, slightly exceeding lower lip of corolla. *Capsule* globose, .15 in. in diam., projecting beyond the closely adpressed calyx-lobes. *Seeds* minute, with sub-hexagonal reticulations. Oliv. Journ. Linn. Soc. III. 184; Hook. f. Flor. Brit. Ind. IV. 333; Ridl. Journ. Bot. XXXIII. 10. *U. bifida*, Wight Ic. t. 1584, f. 2 (not of Linn.).

KEDAH : Langkawi, *Curtis* ! MALACCA : *Griffith* ! PAHANG : Kwala Pahang, *Ridley* 1481 in part !

Oliver has suggested that the colour of the corolla in this species is yellow, and the fact that *Ridley* has mixed it (under his n. 1481) with *U. bifida* might be taken as corroborating Oliver's opinion. *Ridley*, in his paper on the Malay Peninsula *Utricularias*, says, however, that the flowers are pink.

10. *UTRICULARIA RACEMOSA*, Wall. ; var. *filicaulis*, Clarke in Flor. Brit. Ind. IV. 333. A slender herb of damp places. *Leaves* linear or spatulate, absent at time of flowering ; roots fibrous, bladders not seen. *Scapes* erect, very slender, 2 to 4 in. high, rarely higher, rather rigid, occasionally with a few branches, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* few scattered sessile ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the longer, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* white, from .15 to .2 in. across ; spur straight, conical or sub-cylindric, longer than lower lip of corolla. *Capsule* globose, .1 in. long, hidden by the adpressed calyx-lobes. *Seeds* minute, obscurely scrobiculate. *U. filicaulis*, Wall. Cat. 1501 ; A. DC. Prod. VIII. 21 ; Oliv. in Journ. Linn. Soc. III. 186. *U. nivea*, Vahl Enum. I. 203 ; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 144 ; Wight Ic. t. 1582. *U. setacea*, Wall. Cat. 6398 partly. *U. campestris*, Miq. in Pl. Hohenack. n. 596. *U. racemosa*, Ridl. Journ. Bot. XXXIII. 10 (hardly of Wall.).

MALACCA : Ayer Keroh, *Ridley* 10706 ! PAHANG : Kwala Pahang, *Ridley* 1474A ! SINGAPORE : Changi, *Ridley*. PENANG : Waterfall, *Curtis*, fide *Ridley*.—DISTRIB. Indo-China, India.

This plant probably quite deserves to be considered a species distinct from *U. racemosa*, though except in its usually smaller size and its white instead of blue flowers, there is little to distinguish the two.

11. *UTRICULARIA OPHIRENSIS*, Ridl. Journ. Bot. XXXIII. 10. A herb. *Leaves* linear-spatulate or spatulate, absent at time of flowering ; roots fibrous ; bladders not seen. *Scapes* erect 8 to 16 in. high, slender, rigid, often branching, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* sessile, clustered at the ends of the stems and branches in globose or oblong heads .3 to .5 in. long, .25 in. across ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the larger, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* .25 in. across, variable in colour, the lower lip rose-coloured (*Ridley*), both lips blueish with a yellow

hairy gland in the centre of the lower lip inside (*Scortechini*), or white (*Curtis*, *Kunstler*), or white with a yellow tinge (*Kunstler*); spur straight with an incurved tip (*Ridley*), or curved ascending (*Scortechini*), .2 in. long. *Capsule* globose or depressed-globose, hidden by the adpressed calyx-lobes, .1 in. long. *Seeds* oblong or obovate, brown, the broad end glochidiate.

PERAK: Larut, *King's Collector* 1931! 3820! Taipeng, *Wray* 131! *Scortechini* 376! PENANG: Waterfall, *Curtis*! MALACCA: Padang Batu, *Ridley* 10091!

This species, which is here sustained on the authority of Mr. Ridley, who knows well the Malayan *Utricularias* in the field, does not differ very greatly from *U. racemosa*, Wall.; not so much indeed as does the variety *flicaulis* previously described. It matters little whether the three forms are considered specifically distinct or are treated as manifestations of one protean species. A drawing by Mr. Ridley shows pink flowers.

12. *UTRICULARIA ORBICULATA*, Wall. Cat. 1500. A slender herb growing on wet banks, rocks, or tree-trunks. *Leaves* all radical or on small offsets, persistent, orbicular or orbicular-spathulate, .15 in. across; petioles distinct .15 to .25 in. long; roots fibrous, sometimes with bladders. *Scapes* erect, sub-capillary, 2 to 5 in. long; usually 2-4-flowered, sometimes 6-10-flowered; naked or with one or two empty scales, slightly produced at the base; flowers on capillary pedicels .15 to .25 in. long, rather distant; bracts and bracteoles minute, ovate-acute. *Calyx* 2-lobed, the lower lobe very much smaller than the upper, both obtuse, the upper often emarginate, .12 in. long in fruit and about as broad as long. *Corolla* pale violet or white with a yellow centre, .2 to .25 in. wide, with an explanate 5-lobed lower lip and a linear sub-acute spur .2 in. long about as long as the lower lip. *Capsule* globose, .1 in. across, covered by the upper calyx-lobe but projecting beyond the lower. *Seeds* minute, obovoid, glochidiate throughout the upper thicker half. A. DC. Prod. VIII. 18; Oliv. Journ. Linn. Soc. III. 187; Dalz. & Gibs. Bomb. Flor. 136; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11. *U. pusilla*, Grah. Cat. Bomb. Pl. 165. *U. glochidiata*, Wight Ic. t. 1581.

KEDAH: Telayah Tujon, *Curtis*! PERAK: Larut, *Scortechini* 376! on Gunong Bubu, growing on steep side of hill in the sun, amongst moss, at 5,000 feet, flower pale violet; *Wray* 3880! on Gunong Mas, at 5,000 feet, flower white with yellow centre; *Wray* 4146! MALACCA: Mount Ophir, *Griffith*; *Ridley*!—DISTRIB Throughout S.E. Asia.

Order LXXXVII. BIGNONIACEÆ.

Trees or climbing shrubs, more rarely herbs. *Leaves* opposite, rarely whorled or alternate, entire or 1- 2- 3-pinnate or digitate; leaflets entire or sometimes toothed. *Inflorescence* of terminal racemes or panicles; bracts various; flowers showy, usually large, hermaphrodite, irregular or regular. *Calyx* gamosepalous, campanulate, truncate or spathaceous or 2-5-lobed, valvate. *Corolla* gamopetalous, tubular-ventricose, mouth 2-lipped; lobes 5, sub-equal, patent or erecto-patent, bilabiate imbricate in bud. *Stamens* alternate with the corolla-lobes, inserted on the tube, 5 or more usually 4 from the fifth being absent or rudimentary; filaments filiform, often slightly thickened and sometimes hairy at the base; anthers 2-celled, included or shortly exsert; cells oblong or linear, parallel or divergent, dehiscing longitudinally. *Disk* hypogynous, cushion-like or annular, sometimes absent. *Ovary* sessile or shortly stalked, superior, 1-2-celled; style long, filiform; stigma of 2 flattened ovate or oblong lobes; ovules numerous, usually horizontal, anatropous, inserted in 2 to many rows in vertical lines along the edges of the septum in each cell. *Fruit* generally an elongate capsule, loculicidally or septicidally bivalved; the septum enlarged in fruit, deciduous together with the placentas. *Seeds* transverse, affixed by their margins to the septum or to enlarged placentas, vertically compressed, discoid or trigonous, often with a broad wing, embryo usually enveloped in a fine interior membrane; exalbuminous, cotyledons flattened, sometimes folded, radicle stout, lateral.—DISTRIB. Tropical regions of the world, a few in warm temperate regions; absent from Europe, the Mediterranean region and New Zealand. Species about 50.

- Stamens 5; a tree with opposite 2-3-pinnate leaves and very large flat capsules .. .. 1. *OROXYLUM*.  
 Stamens 4; trees :—  
     Anther-cells 2, both perfect :—  
         Leaves 1-3-pinnate :—  
             Calyx spathaceous, split on one side .. .. 2. *DOLICHANDRONE*.  
             Calyx lobed or truncate :—  
                 Septum of the capsule cylindric, spongy :—  
                     Septum prominently pitted; seeds trigonous, transversely grooved without, inner lobe fitting into the septum-pit; ovules 2-seriate in each cell. . . . 3. *STEREOSPERMUM*.  
                     Septum only faintly pitted; seeds flat; ovules many-seriate in each cell .. .. 4. *RADERMACHERA*.  
                 Septum flat, capsule winged; a large tree with large flowers .. .. 5. *PAJANELIA*.

- Leaves simple, often verticillate; calyx usually more or less bilabiate .. .. . 6. *DIPLANTHERA*.  
 Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2-3-pinnate leaves and very long narrowly-linear corolla-tube.. .. . 7. *MILLINGTONIA*.

1. *OROXYLUM*, Vent.

A glabrous tree. *Leaves* opposite, large, 2-3-pinnate; leaflets entire. *Flowers* large, in a long, stout, terminal raceme. *Calyx* large, leathery, campanulate, truncate or obscurely toothed, persistent. *Corolla* large, fleshy; tube campanulate-ventricose; lobes 5, 2 in upper, 3 in lower lip, recurved, toothed, crumpled. *Stamens* 5 inserted near base of tube, posterior one the shortest. *Anthems* 2-celled; cells parallel, oblong. *Disk* large, cushion-like. *Ovary* sub-sessile, contracted at the base, compressed; style slender; stigma 2-lobed; ovules in 4 vertical rows on each placenta, very many. *Capsule* very large, broadly linear, compressed parallel to the septum, septifragally 2-valved. *Seeds* very many, flattened, surrounded by a broad hyaline wing.—*DISTRIB.* A single S.E. Asiatic species.

*OROXYLUM INDICUM*, Vent. Dec. Gen. Nov. 8 (1808). A small tree, reaching 30 to 40 feet in height, with a clean bole and few branches or often none, the head bearing leaves only; branches thick; bark somewhat fleshy; pith large. *Leaves* extremely large, 1-3-pinnate, the lower 3-, middle ones 2-, upper 1-pinnate; 3 to 5 feet long, triangular in outline; rachis smooth, striate, stout, swollen at the base (pulvinus) and joints; primary pinnæ about 45 pairs, the lower ones 2-pinnate at base, pinnules 3- to 5-foliolate; leaflets ovate, entire, acuminate at apex, side ones rounded and often unequal at base, terminal one cuneate at base; 3 to 6 in. long, 2 to 2·5 in. broad; main-nerves 4 to 5 pairs; petiolules slender, 2 to 3 in. long. *Raceme* branch-like, 2 to 3 feet long, very thick, lower part prominently marked with the ovate scars of fallen pedicels; pedicels 5 in. long, stout; bracteoles fused with pedicels. *Calyx* campanulate, 1 in. long, fleshy, truncate, with 5 short teeth. *Corolla* fleshy, 2·5 in. long, yellowish; lobes much crumpled, red, villous on both sides. *Stamens* 5, shortly exsert; base of filaments woolly; anthers divergent below; connective shortly mucronate. *Disk* fleshy, cupular, somewhat lobed. *Ovary* oblong; style slender, hollow, as long as the stamens; stigma 2-lobed, lobes rounded. *Capsule* shortly stalked, concave-flat, elongate oblong, 1·5 to 2·5 feet long, 2·5 to 3·5 in. broad, scarcely 3 in. thick, margins somewhat incurved, back keeled, valves woody, septum flat. *Seeds* very many, flat, surrounded by a very thin, hyaline, shining wing, somewhat rectangular in shape, 3 in. long, 1·5 in. broad; testa membranous; cotyledons emarginate, oblong. Kurz For.

Fl. II. 237; Clarke in Hook. f. Fl. Br. Ind. IV. 378; Trimen Fl. Ceyl. III. 281; Koord. & Val. Bijdr. I. 66; Cooke Bomb. Fl. II. 327; Prain Beng. Plants II. 787. *Bignonia indica*, Linn. Sp. Pl. (1753) 625; Lamk Dict. I. 423; Roxb. Fl. Ind. III. 110; Wall. Cat. 6514. *B. pentandra*, Lour. Fl. Cochinch. 379. *Spathodea indica*, Pers. Syn. II. 173. *Calosanthos indica*, Blume Bijdr. 760; DC. Prod. IX. 177; Wight Ic. t. 1337; Dalz. & Gibs. Bomb. Fl. 161; Bureau Monog. Bign. (1864) t. 9; Miq. Fl. Ind. Bat. II. 752; Brandis For. Fl. 347. "Palega pajaneli," Rheede Hort. Mal. I. t. 43.

PENANG: Curtis 983. PERAK: *Scortechini* 1613; *King's Collector* 7033. PAHANG: common on the banks of the river from Pekan up, flowers dull brownish-purple (*Ridley* in Trans. Linn. Soc. 2nd Ser. III. 326). MALACCA: *Maingay* (K.D.) 1213.—DISTRIB. India, Ceylon, Burma, Sumatra (*Forbes* 1284), Java, and east to Cochin China.

## 2. DOLICHANDRONE, Fenzl.

Trees. *Leaves* opposite, pinnate, leaflets entire or toothed. *Flowers* in terminal racemes or panicles, few, large. *Calyx* spathaceous, cleft to the base down the front, caducous. *Corolla-tube* long or short, inflated above; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; *anthers* glabrous, the cells oblong, at first parallel, afterwards divergent. *Disk* annular, cushion-like. *Ovary* sessile; ovules numerous, usually many-seriate. *Capsule* elongate, terete or somewhat compressed, straight or incurved, loculicidally 2-valved, the septum often thickened and making 4 spurious cells. *Seeds* 1 to  $\infty$ -seriate on the margins of the septum, much compressed, the wing thickened or hyaline.—DISTRIB. Tropical Africa, Asia, and Australia, about 15 species.

DOLICHANDRONE RHEEDI, Seem. Journ. Bot. VIII. 380 (1870). A deciduous tree reaching 40 to 50 feet in height of stem; branchlets stout, marked with prominent leaf-scars, innovations glabrous. *Leaves* imparipinnate, 9 to 12 in. long, leaflets 2 to 4 pairs, with an end one, rachis slender; side leaflets rhomboid, unequal at base, acuminate at apex, margin entire or with few distant serratures, glabrous on both surfaces, 3 to 4 in. long, 1.5 to 2.5 in. broad, main-nerves 6 to 7 pairs, petiolule slender, articulate at base, .3 to .5 in. long; end leaflet similar, but equal at base; all nearly black when dry. *Flowers* few, usually 1 to 4 in a short terminal corymbose raceme; pedicels glabrous, 1 to 1.5 in. long. *Calyx-tube* closed in bud and beaked, spathaceous in flower, 1.5 in. long. *Corolla* white, tubular-funnel-shaped, 4 to 7 in. long; tube slender at first, then gradually expanding; lobes 1 in.

long, crenately crisped, recurved. *Stamens* 4, didynamous; filaments curved inwards; anther-cells large, oblong, divaricate. *Ovary* conical, style slender, stigma of 2 rounded lobes. *Capsule* 1 to 2 feet long, about 1 in. broad, flattened-cylindrical, faintly ribbed, septum thickened in the middle on both sides. *Seeds* very many, overlapping in many rows, rectangular (with the wings), .5 to .7 in. long, .3 in. broad, wings corky; testa membranous; cotyledons flat, deeply emarginate, the lobes nearly orbicular; radicle short. Clarke in Hook. f. Fl. Br. Ind. III. 379; Trimen Fl. Ceyl. III. 282; Koord. & Val. Bijdr. I. 69. *D. longissima*, K. Sch. in Engl. & Prantl Pflanzenfam. IV. 2B. 240, fig. 92 B-D. *Bignonia spathacea*, Linn. f. Suppl. 283. *B. longissima*, Lour. Fl. Cochinch. 380? *Spathodea longiflora*, Vent. Choix. n. 40. *S. Rheedii*, Wall. Cat. 6516; DC. Prod. IX. 206; Wight Ic. t. 1339; Bedd. Fl. Sylv. CLXVIII.; Kurz For. Fl. II. 234; Miq. Fl. Ind. Bat. II. 754. *S. ? Loureiriana*, DC. l.c. 209? *S. Diepenhorstii*, Miq. l.c. "Nir Pongelion," Rheedie Hort. Mal. VI. t. 29.

PENANG: Curtis 1184. PERAK: *Scortechini* 1098; Wray 2501. PAHANG: in mangrove swamps (*Ridley* l.c.). MALACCA: *Griffith* (K.D.) 4066; *Maingay* (K.D.) 1210.—DISTRIB. Malabar coast of India, Ceylon, Burma, Andaman Islands, Malay Archipelago east to New Guinea.

### 3. STEREOSPERMUM, Cham.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire or sometimes toothed. *Flowers* in large lax terminal panicles, white pink or yellow. *Calyx* ovoid, open or closed in bud, truncate or shortly unequally lobed in flower. *Corolla* campanulate or funnel-shaped; mouth bilabiate, upper lip 2-, lower 3-cleft; lobes nearly equal, rounded, crisped, toothed or lacinate. *Stamens* 4, didynamous, included fifth rudimentary; anthers glabrous, cells linear divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, 2-seriate in each cell. *Disk* cupular, fleshy. *Capsule* elongate, terete or somewhat angled, loculicidally 2-valved; septum thick, corky, cylindrical, pitted to receive the seeds in alternating cavities. *Seeds* trigonous, with a transverse groove without and a prominent ridge within, which fits into a deep pit in the septum; wings membranous, lying flat upon the septum; cotyledons folded, 2-lobed, radicle straight.—DISTRIB. Tropical Asia and Africa. About 12 species.

STEREOSPERMUM FIMBRIATUM, DC. Prod. IX. 211 (1844). A large deciduous tree, reaching 70 to 80 feet in height of stem and 1.5 to 3 feet in diam.; bark grey, rough; branchlets stout, innovations and inflorescence viscid-pubescent. *Leaves* imparipinnate, 1 to 2 feet long; rachis



grooved, viscid-pilose; leaflets 7-9, side ones opposite slightly unequal at base; end one equal, oblong-lanceolate, long-acuminate at apex, rounded at base, entire, membranous, viscid-pilose at any rate when young, afterwards glabrescent on upper surface; 4 to 6 in. long, 1.5 to 1.75 in. broad; midrib slender, main-nerves about 7 pairs, curving upwards to and along the margin, reticulations prominent, transverse; petiolules of side leaflets .3 to .4 in. long, of end one 1-1.5 in., articulate. *Panicle* large, very viscid-pilose, dichotomously branched, 5 to 9 in. long and broad; peduncle short, about .5 in. long, thick, secondary peduncles 1 to 1.5 in. long; pedicels slender, about .5 in. long; bracteoles very small, subulate, early caducous. *Flowers* pale lilac, the tube rather darker. *Calyx* campanulate, viscid-pubescent without, glabrous within, .5 in. long; lobes 5, rounded, very short, long-apiculate. *Corolla-tube* funnel-shaped, .1 to .15 in. long; lobes 5, as long as tube, spreading, long-fimbriate, the laciniae .025 in. long. *Stamens* 4, didynamous; filaments slender, glabrous; anther-cells linear-oblong, divaricate, recurved, .05 in. long. *Ovary* cylindric, glabrous; style slender, stigma 2-lobed. *Capsule* cylindric, more or less quadrangular, torulose, 1 to 2 feet long, .5 in. in diam.; septum thick, corky. *Seeds* trigonous, with rather thick wings; 1 in. long, .3 in. broad, deeply immersed in alternate pits in the septum. Kurz For. Fl. II. 231; Clarke in Hook. f. Fl. Br. Ind. IV. 383. *Bignonia fimbriata*, Wall. Cat. 6500.

JUNKSEYLO (Tongkah): *Curtis* 2912. PERAK: *Wray* 3334; *Scortechini* 1746; *King's Collector* 5701. PAHANG: *Ridley* l.c. MALACCA: *Maingay* (K.D.) 1211.—DISTRIB. Burma.

#### 4. RADERMACHERA, Zoll & Mor.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire. *Flowers* in terminal racemes or panicles, showy. *Calyx* urceolate, open or closed in bud, entire or shortly lobed in flower. *Corolla* funnel-shaped; tube narrow, mouth more or less 2-lipped, upper lip 2-, lower 3-lobed, the lobes spreading, rounded. *Stamens* 4, didynamous, with a fifth sterile one, included; filaments slender; anthers 2-celled, the cells divaricate. *Disk* cupular, fleshy, entire. *Ovary* cylindrical; cells 2; ovules very numerous in many rows in each cell. *Capsule* slender, compressed, terete, often spirally twisted; the septum slender, continuous, cylindric or compressed, very faintly pitted and bearing on each side a double row of seeds. *Seeds* very small, rounded, flattened, resting on a very slight depression but not sunk in the septum; wings hyaline, shining; cotyledons flat, not lobed; radicle minute.—DISTRIB. Burma, the Malay Peninsula, and Malay Archipelago. About 8 species.

Leaves 1-pinnate, leaflets prominently glandular at base, capsule under 10 in. long .. .. .	1. <i>R. glandulosa</i> .
Leaves 2-3-pinnate, leaflets not glandular at base, capsule over 15 in. long .. .. .	2. <i>R. amena</i> .

1. *RADERMACHERA GLANDULOSA*, K. Sch. in Engl. & Prantl Naturl. Pflanzenfam. IV. 3B, 243 (1894). A small tree with spreading branches, reaching 15 to 30 feet in height and 6 to 12 in. in diam. of stem.; branches stout, with pale brown, corky bark; branchlets smooth, with prominent oblong lenticels; innovations slightly puberulous. *Leaves* imparipinnate, 15 to 20 in. long; rachis smooth, swollen at the nodes and at the base, glabrous; leaflets 3 to 7, side ones opposite, slightly unequal at base, end one equal, all furnished with prominent large glands at the base above the petiolule, elliptic or elliptic-oblong, acute or abruptly acuminate at apex, rounded at base, entire, glabrous, chartaceous, 5 to 10 in. long, 3 to 5 in. broad; midrib slender, main-nerves 9 to 11 pairs, arching upwards to and along the margin; reticulations transverse, prominent; petiolules .3 to .4 in. long, end one 1 in. long. *Panicles* terminal and occasionally axillary, 6 to 12 in. long; peduncle often very long, branches short, scarcely .5 in. long, few-flowered; pedicels slender, .2 to .4 in. long; bracteoles minute, caducous; flowers white, shaded with pink, calyx red. *Calyx* campanulate, truncate, persistent, .15 in. long, glabrous, margin undulate only. *Corolla-tube* cylindric below for .5 in., then campanulate for nearly 1 in., .5 in. wide at mouth, glabrous without, slightly pubescent within; lobes 5, 2 upper smaller than 3 lower, .3 in. long, margins slightly crispate-ciliate. *Stamens* 4, didynamous, included; filaments slender, anther-cells linear, .1 in. long, divaricate, sterile stamen clavate. *Disk* cupular, glabrous. *Ovary* oblong; style slender, .75 in. long; stigmas 2, oblong. *Capsule* slender, terete, 6 to 10 in. long, .25 in. broad; valves thin, chartaceous, flat after dehiscence, slightly keeled on back; septum cylindric, slightly pitted, white, spongy. *Seeds* very many, flat, .6 to .8 in. long and .05 to .1 in. broad (including the hyaline often fimbriate wings); testa membranous; cotyledons flat, oblong, broader than long (.05 in.); radicle minute. *R. stricta*, Zoll.; Bureau Monog. Bign. t. 28. *Spathodea glandulosa*, Blume Bijdr. 762; DC. Prod. IX. 207; Miq. Fl. Ind. Bat. II. 755. *Bignonia Porteriana*, Wall. Cat. 6509; DC. l.c. 165. *Lagaropyxis glandulosa*, Miq. in Ann. Mus. Lugd. Bat. I. 199. *Stereospermum glandulosum*, Miq. Fl. Ind. Bat. Suppl. 565; Clarke in Hook. f. Fl. Br. Ind. IV. 383; Koord. & Val. Bijdr. I. 74.

PENANG: Wallich 6509; Curtis 140. PERAK: Wray 1346, 2143; Scortechini 114, 1156; King's Collector 3353, 6379; Kunstler 981. MALACCA: Maingay (K.D.) 1217; Goodenough 1960. SELANGOR: Ridley

8537. NEGRI SEMBILAN: *Goodenough* 1860. PAHANG: *Ridley* l.c.—  
DISTRIB. Burma (*Lobb*), Sumatra (*Forbes* 2663, 2693), Java, Borneo  
(*Beccari* 811).

2. *RADERMACHERA AMÆNA*, Seem. Journ. Bot. VIII. 146 (1870). A  
very tall tree, reaching 80 feet in height, all parts glabrous; branches  
thick, with prominent leaf-scars. *Leaves* 2–3-pinnate, apparently 2 feet  
long or longer, the lower pinnæ only again divided, the upper ones simply  
pinnate; rachis smooth, thick, swollen and articulate at the nodes,  
enlarged at foot; petiole about 6 in. long, all joints easily separating  
when dry: leaflets oblong-lanceolate when young, elliptic-oblong when  
old, shortly and abruptly blunt-acuminate at apex, rounded or attenuate  
at base and slightly decurrent, glabrous, entire, coriaceous, 4 to 6 in.  
long, 2 to 3 in. broad; midrib thick, impressed above, main-nerves  
about 10 pairs, joined at about .25 in. from the margin in a looped  
nerve, secondary nerves alternate with the main-nerves, reticulations  
obscure; petiolules .4 or .5 in. long, channelled above by the decurrent  
margins of the blade. *Panicles* much and usually trichotomously  
branched, rachis terete, upper branches channelled; peduncle about  
5 in. long; pedicels slender; bracteoles minute, rounded; flowers  
white, tinted with pink outside and with yellow streaks within; the  
calyx dark red. *Calyx* in bud closed, in flower 2-lipped, the lips bluntly  
apiculate; tube and lobes equal, .3 in. long, glabrous, deciduous.  
*Corolla-tube* shortly cylindric at first for .2 to .3 in. long, then cam-  
panulate, glabrous; lobes nearly equal, rounded, crenulate on the  
margins, .2 to .3 in. long. *Stamens* 4, with an abortive fifth; filaments  
thickened and glandular-hairy below, slender and glabrous above;  
anther-cells linear, curved, divaricate, the connective prominently  
apiculate. *Disk* cupular, glabrous. *Ovary* oblong, flattened; style  
slender, as long as tube; stigma bilobed, lobes lanceolate; cells 2,  
ovules very many. *Capsule* slender, torulose, 12 to 18 in. long, 3 in.  
broad; valves thin, chartaceous, flattened after dehiscence and then  
.25 in. broad, keeled on the back; septum cylindric, spongy, speedily  
caducous, bearing on each border a row of small seeds. *Seeds* (with  
wings) .75 in. long, .1 to .15 in. broad, wings hyaline, rounded; testa  
membranous; cotyledons flat, oblong, longer than broad; radicle  
minute. Kurz For. Fl. II. 232. *R. gigantea* and *R. Lobbii*, Miq. in  
Ann. Mus. Lugd. Bat. III. 250. *Spathodea amæna*, DC. Prod. IX. 208.  
*S. Lobbii*, Teys. & Binn. in Nat. Tijdsch. XXV. 413. *Spathodea*  
*gigantea*, Bl. Bijdr. 761; Miq. Fl. Ind. Bat. I. 755; DC. l.c. 207.  
*Bignonia amæna*, Wall. Cat. 6512 and Pl. As. Rar. II. 78. t. 183.  
*Lagaropyxis gigantea*, Miq. in Ann. Mus. Lugd. I. 198. *Stereospermum*  
*hypostictum*, Clarke in Hook. f. Fl. Br. Ind. IV. 384; Koord. & Val.  
Bijdr. I. 72.

PERAK: *Scortechini* 1496; *Wray*. MALACCA: *Griffith* (K.D.) 4070; *Maingay* 1212 (*part*). SINGAPORE: *Maingay* (K.D.) 1212 (*part*); *Cantley* 79,204.—DISTRIB. TAVOY, Java.

### 5. PAJANELIA, DC.

A large tree, glabrous except the flowers. *Leaves* large, imparipinnate; leaflets entire, numerous. *Flowers* large, in large terminal thyrsoid panicles, dark red. *Calyx* large, ovoid and closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla-tube* cylindric below, ventricose-campanulate above, wide at the mouth; limb sub-bilabrate, lobes 5, spreading, recurved, unequal. *Stamens* 4, with a rudimentary fifth, didynamous, sub-exsert; filaments slender; anthers glabrous, cells oblong, divergent. *Disk* annular. *Ovary* 2-celled, ovules on each placenta numerous,  $\infty$ -seriate. *Fruit* an elongate narrowly oblong capsule, loculicidally dehiscent, the septum contrary to the valves, the margins of the valves extended in broad wings. *Seeds* in several rows on the edges of the septum, compressed, with hyaline wings; cotyledons flat, radicle small.—DISTRIB. A single S.E. Asiatic species.

PAJANELIA MULTIJUGA, DC. Prod. IX. 227 (1845). A large evergreen tree, reaching 60 to 80 feet in height and 2 feet in diam. of stem; glabrous except the corolla; bark .25 in. thick, dark grey, rough; branches thick, lenticellate. *Leaves* imparipinnate, 1.5 to 3 feet long, glabrous; rachis angular; leaflets 10 to 12 pairs with a terminal one, very unequal-sided, elliptic-ovate, acute at apex, rounded at base on the upper, cuneate on the lower side, chartaceous, margins entire recurved, 4 to 8 in. long, 2.5 to 3.5 in. broad; midrib slender, main-nerves 9 on upper, 7 on lower side, reticulations transverse; petiolule stout, .2 to .3 in. long. *Panicles* thyrsoid, 12 to 18 in. long; rachis stout, fleshy, lenticellate; primary branches 1 to 2 in. long, similar, secondary ditrichotomously branched; pedicels .5 in. long; bracteoles minute; flowers large, pale yellow, throat purple within. *Calyx* closed in bud, in flower campanulate, 1 to 1.5 in. long; tube broad at base with keel-like folds without, lobes 5, irregular, acute. *Corolla* 2 to 2.5 in. long, cylindric below, then somewhat constricted, then ventricose-campanulate; lobes 5, unequal, at first parallel-sided, then broadening into a blunt rounded crispately crenulate limb; the upper part of the tube and the lobes, especially on the margin, grey-pubescent. *Stamens* 4 with a rudimentary fifth, didynamous; filaments slender, glabrous; anther-cells oblong, divergent. *Disk* annular, pulvinate, glabrous. *Ovary* sessile, oblong; style slender, angled, broadening upwards into a 2-lobed clavate stigma; cells 2, ovules very numerous. *Capsule* flat, lanceolate, broadly winged, the wings split, glabrous, 1 to 1.5 feet long, 2 to 2.5 in. broad; septum

transverse, quadrangular in section. *Seeds* exceedingly numerous, in many rows and imbricating, curved; furnished at either end with a very thin hyaline wing, seeds and wing reaching 1·5 in. long and ·5 in. broad; testa membranous; cotyledons obcordate, flat; radicle slender. Bureau Monog. Bign. t. 20; Kurz For. Fl. II. 237. *P. Rheedii*, Wight Ic. tt. 1343-4; Clarke in Hook. f. Fl. Br. Ind. III. 384; Bedd. Fl. Sylv. CLXIX.; Cooke Bomb. Fl. II. 333; Prain Beng. Plants II. 790. *Bignonia indica*, var.  $\beta$  Linn. Sp. Pl. 871; Lour. Fl. Cochinch. 460. *B. Pajanelia*, Ham. in Trans. Linn. Soc. XIII. 316. *B. longifolia*, Willd. Sp. Pl. III. 306; K. Sch. in Engl. & Prantl Pflanzenfam. IV. 38, 244. *B. multijuga*, Wall. Cat. 6503 and Pl. As. Rar. 1. 81, tt. 95, 96. "Pajaneli," Rheedee Hort. Mal. I. 44.

PENANG: *Jack*. PERAK: *Scortechini*; *King's Collector* 2616, 3958. —DISTRIB. Eastern Bengal, Burma, Andaman Islands, Malabar coast.

## 6. DIPLANTHERA, Banks & Solander.

Trees, more or less hairy. *Leaves* undivided, large, opposite or whorled. *Flowers* large, yellow, in short thick panicles among the uppermost leaves, the primary branches of the panicles shortly verticillate and densely cyme-bearing. *Calyx* campanulate, oblong and closed when young, with 2 to 5 valvate lobes connivent in flower and sometimes sub-bilabiate. *Corolla* tubular-ventricose; lobes 5, rounded, sub-equal. *Stamens* 4, didynamous, exsert; filaments involute in bud; anthers glabrous; cells linear, at first parallel, afterwards divaricate. *Disk* thick, pulvinate. *Ovary* sub-sessile, ovules densely many-seriate. *Capsule* oblong-fusiform, woody, loculicidally 2-valved; septum flat, thick. *Seeds* many-seriate, between the margins of the septum, flattened, with a broad hyaline wing.—DISTRIB. From the Malay Peninsula to New Caledonia and Australia: about 6 species.

DIPLANTHERA BANCANA, Scheffer in Nat. Tijdschr. XXXI. 334 (1870). A lofty tree; branches stout; branchlets pale brown, pubescent, marked with lenticels and prominent leaf-scars. *Leaves* chartaceous, undivided, ovate, obtuse at apex, cordate at base; margins irregularly undulate, furnished with 1 to 2 glandular pits on the upper surface at the insertion of the petiole; both surfaces slightly pubescent, especially beneath and on the nerves; 8 to 13 in. long, 5 to 8 in. broad; midrib stout, main-nerves 10 to 12 pairs, the lowest 3 close together and spreading more or less downwards or horizontally, the rest distant, irregular, often branched at two-thirds of their length, the branches all anastomosing near the margin; reticulations prominent, transverse; petiole stout, 2 to 4 in. long, base articulate. *Panicles* terminal, 4 to 5 in. in diam., tawny-villous; common peduncle 5 to 6 in. long, ·25 in. thick;

branches easily disarticulating; pedicels slender, .75 in. long; bracts leafy, spatulate, .2 in. long; bracteoles linear-subulate, .1 to .2 in. long; flowers yellow. *Calyx* campanulate, closed in bud, 5-lobed in flower, .7 to .8 in. long; often 2-labiate, the upper lip with 2 divisions of 2 lobes each, the lower 1-lobed, acute; tube puberulous without. *Corolla* tubular-ventricose, 1 in. long; lobes 5, uppermost and 2 lowest acute; side lobes broadly obtuse, margins incurved; tube glabrous except for a ring of tawny hairs at the insertion of the filaments. *Stamens* 4, filaments inserted a little above the base of the tube, involute in bud; anther-cells linear, pendulous. *Ovary* oblong; style slender; stigmas 2, lanceolate; ovules very many. *Capsule* 6 in. long, 1.2 in. broad, smooth, valves boat-shaped after dehiscence. *Seeds* 1.5 in. long, .75 in. broad, winged on 3 sides; cotyledons flat, emarginate, .15 in. long, .25 in. broad. Clarke in Hook. f. Fl. Br. Ind. IV. 385.

PENANG: Curtis 870, 1569. MALACCA: Walker 283; Maingay (K.D.) 1214.—DISTRIB. Bangka (Teysmann 7666).

#### 7. MILLINGTONIA, Linn. f.

A tall tree with corky bark. *Leaves* opposite, 2–3-pinnate; leaflets entire or crenate. *Flowers* white, in terminal corymbose panicles. *Calyx* small, cupular, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, sub-equal, sub-valvate, the 2 upper connate to near the middle. *Stamens* 4, didynamous, with no rudimentary fifth, shortly exsert, inserted on the mouth of the tube; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular, cushion-like. *Ovary* sub-sessile, cylindric-conical; style slender; stigma bi-lobed; ovules numerous, in about 4 rows on each placenta. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, surrounded on 3 sides by a thin hyaline wing.—DISTRIB. A single S.E. Asiatic species.

MILLINGTONIA HORTENSIS, Linn. f. Suppl. 291 (1781). A tall erect tree reaching a height of 80 feet and a girth of 6 to 12 feet; bark corky, deeply fissured; branches stout, drooping; branchlets somewhat slender, flattened, lenticellate; innovations and young leaves slightly pubescent. *Leaves* opposite, 2–3 pinnate, about 1.5 to 2 feet long or longer; rachis angular, channelled; leaflets ovate or ovate-lanceolate, acuminate at apex, truncate at base, membranous; glabrous when old, pubescent when young; margins entire or (in young plants and shoots chiefly) broadly crenate; 1 to 2 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces as are the 4–5 pairs of main-nerves; petiolules slender, in upper leaflets often none. *Panicles* 8 to 12 in. long, branches divaricate; rachis somewhat angular, flattened; peduncles

1 to 3 in. long; bracts and bracteoles very small, caducous; pedicels slender, .3 to .4 in. long; flowers white. *Calyx* cupular, .1 in. long; lobes very shallow, rounded, recurved. *Corolla-tube* very slender, 1.5 to 2.5 in. long, about .07 to .1 in. broad, glabrous; lobes ovate-oblong, acute, pubescent within, .5 to .6 in. long, .2 to .3 in. broad. *Stamens* inserted at the top of the tube; filaments slender, .4 to .5 in. long; anthers rounded, ovate. *Ovary* slender; style very slender, exsert, stigma-lobes ovate. *Disk* cushion-like, .05 in. high. *Capsule* about 12 to 15 in. long and .75 in. broad, acute at both ends; valves woody, septum ultimately free. *Seeds* in several rows along the margins of the septum, much overlapping, including the wing about 1 in. by .5 in.; wing narrow at the apex, hyaline. DC. Prod. IX. 182; Wight Ill. 16 *bis* fig. 6; Bureau Monog. Bign. t. 8; Bedd. Fl. Sylv. Madr. t. 249; Brandis For. Fl. 347; Kurz For. Fl. II. 238; Clarke in Hook. f. Fl. Br. Ind. IV. 377; Cooke Bomb. Fl. II. 334; Prain Beng. Plants 788. *Bignonia Azedarachta*, Koen. Ann. Bot. I. 178. *B. suberosa*, Roxb. Cor. Pl. III. 11, t. 214 and Fl. Ind. III. 111; Wall. Cat. 6513.

MALACCA: *Maingay* (K.D.) 1215. SINGAPORE: *Deschamps*.—  
DISTRIB. India, Burma (*vide* Kurz), Sumatra (*Miq. Fl. Ind. Bat. Suppl.* 565).

Whether the specimens were gathered from really wild trees there is nothing to show, but if Kurz is right in his statement that the cork-tree, so well known in India in cultivation, is wild in tropical forests from Martaban to Tenasserim, it may well occur in a wild state further south in the Peninsula.

## Order LXXXVIII. PEDALINEÆ.

[By D. PRAIN.]

Herbs or undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed; stipules 0. *Flowers* irregular, solitary or, rarely, clustered or racemose, usually axillary; pedicels short; bracts minute or 0. *Sepals* 4–5, slightly connate below. *Petals* connate in a tubular-ventricose corolla; limb 5-lobed, obscurely 2-lipped; lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Carpels* 2, connate in a 2-celled, rarely 1-celled ovary; ovules many or few, superposed; style filiform; stigma shortly 2-lobed. *Fruit* hard, indehiscent, or a 2- (less often 3–4-) valved capsule. *Seeds* without wings; albumen 0.—DISTRIB. Species about 40, in tropical and sub-tropical countries.

### SESAMUM, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed, lobed, or divided. *Flowers* axillary, solitary or few and

fascicled, shortly pedicelled. *Sepals* connate in a small 5-partite calyx. *Corolla* 2-lipped; tube ventricose; lobes rounded, those of the upper lip rather smaller than the others. *Stamens* 4, didynamous, included; anthers sagittate, cells sub-parallel, distinct. *Carpels* connate in a 2-celled ovary; cells soon divided into two chambers by a false dissepiment intruded between the placentas; ovules many, 1-seriate in each chamber; style filiform; stigma 2-lobed. *Fruit* an oblong or ovoid capsule, usually 4-angled and 4-grooved, 4-chambered, loculicidally 2-valved. *Seeds* many, obliquely oblong, somewhat compressed, foveolate.—DISTRIB. Species 10, Africa and S.E. Asia.

SESAMUM INDICUM, DC. Prod. IX. 250. An erect pubescent or puberulous herb, 1 to 2 feet high. *Leaves* oblong or ovate, variable, the lower often lobed or pedatisect; the middle ovate, toothed; the upper often narrow-oblong, sub-entire; blade 3 to 5 in. long; petioles .5 to 2 in. *Flowers* axillary, solitary rarely 2-3-nate; pedicels .5 in. long. *Calyx-lobes* .25 in. long, lanceolate. *Corolla* pubescent, 1.25 in. long, whitish or with red, or purplish, or yellow marks. *Capsule* oblong, tetragonous, erect, scabrid-pilose, 1 in. long, uniformly .25 in. wide throughout; apex usually shortly acuminate; dehiscence usually by 2 valves half-way down, sometimes to the base, and sometimes each valve subsequently divided. *Seeds* brown, smooth. Wall. Cat. 6408; Wight Ill. 163; Hook. f. Flor. Brit. Ind. IV. 387; Bot. Mag. t. 1688. *S. orientale*, Linn. Sp. Pl. 634; Gaertn. Fruct. II. 132 t. 110; Lamk Ill. t. 528; Roxb. Flor. Ind. III. 100. *S. luteum*, Retz Obs. VI. 31; DC. Prod. IX. 250. *S. occidentale*, Her. & Reg., DC. Prod. IX. 250; Thw. Enum. 442. Rumph. Herb. Amb. t. 76, f. 1. Rheede Hort. Malab. IX. tt. 54, 55.

PENANG: *Wallich!* KING: *Wray!* SCORTECHINI! MALACCA: *Derry!* JOHORE: *Fielding!* SINGAPORE: *Hullett!*—DISTRIB. Cultivated in all hot countries.



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# JOURNAL

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 19.

This part contains three Families, Nos. 75 *Apocynaceæ* and 76 *Asclepiadaceæ*, both done by Mr. Gamble, with No. 77 *Loganiaceæ*, done by Sir G. King, with the exception of the genus *Strychnos*, contributed by Mr. Gamble.

The 3 Families comprise 86 genera and 234 species. There are 2 new genera and 70 new species.

### Family LXXV.—APOCYNACEÆ.

Trees or erect or climbing shrubs, rarely herbs; more or less laticiferous. *Leaves* simple, generally opposite, sometimes whorled, rarely alternate or scattered, entire, penninerved; stipules none or represented by interpetiolar ridges or glands. *Inflorescence* generally of terminal or pseudo-terminal or axillary cymes which are solitary or clustered in 2- or 3-chotomous panicles, corymbs or pseudo-umbels; bracts usually small and caducous; flowers small to large, often showy, hermaphrodite, regular. *Calyx* inferior; tube usually very short; lobes 5, imbricate, often with (usually scale-like) glands inside near the base. *Corolla* gamopetalous, salver-shaped or funnel-shaped, rarely campanulate urceolate or subglobose, often with scales or a ring or protuberances in the mouth of the tube; lobes 5 (rarely 4), spreading, often contorted or twisted in bud, rarely valvate, overlapping to the right or left (as seen from outside). *Stamens* 5, rarely 4, alternate with the corolla-lobes, inserted in the corolla-tube or on its mouth; filaments short, often decurrent in

ridges inside the tube; anthers linear-oblong or sagittate, free or connivent in a cone and adhering to the stigma by the connective; cells 2, longitudinally dehiscent, sometimes produced at the base in barren spurs; pollen granular, usually spherical, with 3 pores or 2 to 3 rounded protuberances. *Disk* none, or annular or cupular, or reduced to 2 to 5 scales or glands. *Ovary* superior, free or somewhat adnate to the disk, 1-celled with 2 parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels; ovules in each cell 2 or few or many and 2- to  $\infty$ -seriate, rarely solitary, anatropous, usually pendulous; style 1, entire or divided at the base; stigma various, usually ending in a bifid apiculus and frequently with a ring or other appendages, often viscous. *Fruit* a dry or fleshy drupe, berry or samara, or of two baccate or follicular mericarps. *Seeds* various, often compressed, sometimes winged, sometimes with a tuft of hairs at one or both ends; testa coriaceous, crustaceous or membranous; albumen hard, fleshy or scanty or none; embryo straight; cotyledons flat, concave, convolute or contorted; radicle superior.—**DISTRIB.** Chiefly tropical; genera about 110 to 120; species probably about 1000, or even more.

Anthers included, free from the stigma, cells rounded at the base; corolla-lobes usually overlapping to the left:—

Ovary of 2 wholly combined carpels, 1-2-celled; fruit large, usually fleshy or pulpy within; seeds without wing or pencil of hairs (coma) (Tribe I. *CARISSEÆ*):—

Ovary 1-celled, with parietal ovules:—

- |                                 |    |    |                 |
|---------------------------------|----|----|-----------------|
| Fruit indehiscent; albumen none | .. | .. | 1. WILLUGHBEIA. |
| Fruit 2-valved; albumen present | .. | .. | 2. CHILOCARPUS. |

Ovary 2-celled, with axile ovules:—

- |                                                                     |                     |
|---------------------------------------------------------------------|---------------------|
| Flowers 4-merous; albumen none; corolla-throat naked                | 3. LEUCONOTIS.      |
| Flowers 5-merous; albumen present; corolla-throat with lobed scales | .. .. 4. MELODINUS. |

Ovary of 2 distinct carpels, united by the style; fruit various, seeds peltate (Tribe II. *PLUMERIÆ*):—

Calyx eglandular within; carpels 1-2-, rarely 4-6-ovuled; fruit of 2 1-seeded drupes or berries, rarely moniliform (Subtribe 1. *RAUWOLFIINÆ*):—

Leaves usually whorled:—

- |                                                                                |       |               |
|--------------------------------------------------------------------------------|-------|---------------|
| Albumen ruminant; erect or climbing shrubs with more or less coriaceous leaves | .. .. | 5. ALYXIA.    |
| Albumen even; erect shrubs with fleshy or soft leaves, membranous when dry     | .. .. | 6. RAUWOLFIA. |
| Leaves opposite; disk none; albumen smooth                                     | ..    | 7. HUNTERIA.  |

Calyx glandular within:—

Carpels 2-, rarely 4-ovuled, ovules on opposite sides of a thick placenta; fruit a 1- or 2-seeded drupe or berry (Subtribe 2. *CERBERINÆ*):—

Leaves alternate or scattered; corolla funnel-shaped, large, lobes overlapping to left; fruit drupaceous, over 2 in. long .. .. . 8. *CERBERA*.

Leaves opposite or whorled; corolla hypocrateriform, lobes overlapping to right:—

Leaves usually whorled, fleshy when green, membranous when dry; fruit drupaceous, over 2 in. long .. 9. *OCHROSIA*.

Leaves opposite, membranous to subcoriaceous; fruit capsular, angled .. .. . 10. *KOPSIA*.

Carpels 6- $\infty$ -ovuled; fruit of 2 follicular mericarps (Subtribe 3. *EUPLOMERINÆ*):—

Leaves in whorls, main-nerves prominent; cotyledons flat:—

Follicles slender, long, cylindric; seeds small, oblong, with tufts of hair at the ends; style filiform; stamens usually near the top of the tube .. 11. *ALSTONIA*.

Follicles very large, stout; seeds large, with a membranous wing; style none or minute; stamens usually at the middle of the tube .. .. . 12. *DYERA*.

Leaves opposite:—

Follicles slender, with comose seeds; style short; cotyledons complicate .. .. . 13. *HOLARRHENA*.

Follicles stout, short, with arillate non-comose seeds; style filiform; cotyledons flat .. .. . 14. *ERVATAMIA*.

Anthers included or exserted, conniving in a cone around the top of the style and adherent to the stigma by a point on the connective, cells produced downwards into empty spurs; ovary of 2 distinct rarely connate carpels united by the style; fruit of 2 follicular mericarps; seeds comose at one or both ends (Tribe III. *ECHITIDÆ*):—

Anthers more or less exserted (Subtribe 1. *PARSONSIINÆ*):—

Corolla-lobes valvate; carpels connate in flower .. 15. *PARSONSIA*.

Corolla-lobes imbricate; carpels separate:—

Corolla-throat naked; cotyledons flat:—

Corolla rotate; connective of anthers thickened at back .. .. . 16. *VALLARIS*.

Corolla hypocrateriform; connective not thickened .. 17. *POTSIA*.

Corolla-throat usually with scales, rotate or hypocrateriform; cotyledons convolute .. .. . 18. *WRIGHTIA*.

Anthers included:—

Corolla-throat with 5-10 scales (Subtribe 2. *NERIINÆ*):—

Corolla-lobes long or tailed .. .. . 19. *STROPHANTHUS*.

Corolla-throat naked (Subtribe 3. *ECHITIDINÆ*):—

Corolla-lobes valvate or overlapping to the left:—

Corolla-lobes valvate, tube urceolate; flowers minute.. 20. *URCEOLA*.

Corolla-lobes overlapping to left, tube subcampanulate; flowers small .. .. . 21. *PARAMERIA*.

Corolla-lobes imbricate, overlapping to the right:—

Corolla minute, urceolate, lobes scarcely twisted to left in bud .. .. . 22. *ECDSANTHERA*.

Corolla hypocrateriform, lobes twisted to left in bud:—

Seeds beaked:—

Lobes of corolla not markedly spiral in bud; beak of seed with tufted coma:—

Albumen of seed present; flowers, leaves and follicles very large .. .. 23. CHONEMORPHA.

Albumen of seed none; flowers, leaves and follicles moderate-sized.. .. 24. RHYNCHODIA.

Lobes of corolla markedly spiral in bud; coma of seed decurrent on the beak .. .. 25. ANODENDRON.

Seeds not beaked:—

Seeds narrowed at the end; cotyledons linear:—

Albumen scanty; corolla-lobes entire, rounded 26. CLEGHORNIA.

Albumen copious; corolla-lobes fimbriate, acuminate .. .. 27. ICHNOCARPUS.

Seeds usually broadened at the end:—

Cotyledons oblong, or linear-oblong; corolla rather large, lobes more or less rounded:—

Calyx 5-partite, lobes lanceolate; cymes corymbose:—

Apex of seed slender below the tuft of the coma; follicles terete .. .. 28. AGANOSMA.

Apex of seed broadly flattened below the tuft of the coma; follicles more or less flattened .. .. 29. TRACHELOSPERMUM.

Calyx 5-fid, lobes narrow; cymes paniculate 30. EPIGYNUM.

Cotyledons narrowly linear; corolla very small, lobes very oblique, usually forked .. .. 31. MICRECHITES.

The following plants of this Family are cultivated, and seem to be occasionally found run wild in the Peninsula:—

1. ALLAMANDA CATHARTICA, Linn. Mantiss. II. 214 (1771). A scandent milky shrub, native of South America. It has oblanceolate acuminate leaves in whorls of 2 to 4 and large yellow flowers. PENANG: *G. King*; *Deschamps*. SINGAPORE: *T. Anderson*.

2. CARISSA CARANDAS, Linn. Mantiss. I. 52 (1767). A large ever-green thorny shrub, native of India, with small white flowers and an edible fruit. MALACCA: *Maingay*.

3. LOCHNERA ROSEA, Reichb. Consp. Reg. Veg. 134 (1828). A garden shrub with shining obovate leaves and white or pink flowers; common in gardens, and also found run wild on roadsides especially near the coast. It is probably native of the West Indies. PENANG: *Curtis* 1067.

There are probably others, which, like *Plumeria acutifolia*, Poir., *Nerium Oleander*, Linn., and *Thevetia neriifolia*, Juss., are commonly cultivated in gardens in the Peninsula, but do not run wild. We have, however, seen no specimens.



Tribe I.—CARISSEÆ.

1. WILLUGHBEIA, Roxb.

Large sarmentose or climbing shrubs, generally bearing tendrils which are modified peduncles. *Leaves* opposite, shortly petiolate, penninerved. *Flowers* in dense, rarely in lax, axillary cymes; pedicels enlarged in fruit. *Calyx* 5-partite, eglandular. *Corolla* hypocrateriform, the mouth naked; lobes broad or linear, overlapping to the left, nearly straight in bud. *Stamens* inserted near the base of the tube, included; anthers lanceolate, the connective apiculate, the cells rounded at the base. *Disk* none. *Ovary* entire, 1-celled; style short, its top obconic or urceolate; stigma capitate or ovoid-conical, often slightly annulate at the base and slightly bifid at the apex; ovules numerous, on two parietal placentas. *Fruit* a large globose berry with a hard pericarp. *Seeds* numerous, embedded in pulp, ellipsoid, compressed; albumen none; cotyledons fleshy, thick, plano-convex; radicle short.—**DISTRIB.** India, Ceylon, Burma, Malay Peninsula and Archipelago; about 12 species.

Cymes with stout peduncles and pedicels; stamens usually near the base or middle of the corolla-tube; stigma conical, on a short style (Subgenus I. *EUWILLUGHBEIA*):—

Main nerves of leaves 6 to 8 pairs; leaves orbicular or elliptic, pale when dry, glaucescent beneath; corolla-lobes 1 in. long 1. *W. grandiflora*.

Main nerves of leaves 10 to 16 pairs, rather distant:—

Corolla-lobes .3 to .4 in. long; leaves scarcely coriaceous:—

Cymes few-flowered, nearly glabrous; leaves long acuminate .. .. 2. *W. edulis*.

Cymes many-flowered, pubescent; leaves obtuse or with a short blunt tip .. .. 3. *W. oblonga*.

Corolla-lobes under .25 in. long; leaves coriaceous or nearly so:—

Main nerves flattened on lower surface of coriaceous leaves 4. *W. coriacea*.

Main nerves sharp and slender on lower surface of thinly coriaceous leaves .. .. 5. *W. firma*.

Main nerves of leaves over 20 pairs, parallel and close:—

Corolla-lobes .3 in. long; leaves thinly chartaceous, up to 10 in. long, blunt-acuminate at apex .. 6. *W. martabanica*.

Corolla-lobes .4 to .7 in. long; leaves thinly coriaceous, hardly over 6 in. long, sharply acuminate at apex .. 7. *W. tenuiflora*.

Cymes with slender peduncle and pedicels; stamens near the top of the corolla-tube; stigma cylindric, seated on the obconic top of the slender style (Subgenus II. *URNULARIA*):—

Main nerves of leaves under 20; corolla-lobes ovate, recurved in flower .. .. 8. *W. flavescens*.

Main nerves of leaves over 20; corolla-lobes narrowly oblong, erect in flower .. .. 9. *W. rufescens*.

1. *WILLUGHBEIA GRANDIFLORA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A stout climbing shrub; branchlets stout, dark brown to nearly black; tendrils woody, thick, branched. *Leaves* coriaceous; orbicular or elliptic, obtuse or with a very short blunt broad acumination at apex, rounded at base; glabrous and shining, pale reddish-yellow on the upper surface, cinnamon-coloured, soft and glaucescent on the lower; margins slightly recurved; 3 to 5 in. long, 3 to 3·5 in. broad; midrib stout, impressed on the upper surface, somewhat flattened on the lower; main nerves 6 to 8 pairs, distant, impressed above, raised beneath, at an angle of about 60° with the midrib, at first straight then curving near the margin to meet in an irregular intramarginal nerve; secondary nerves few and chiefly near the apex; reticulations transverse, distinct but not prominent; petiole stout, rugose or corrugated, channelled above, ·5 to 1 in. long. *Cymes* sub-sessile, crowded, puberulous; bracteoles broadly ovate, ciliate; pedicels stout, ·05 to ·1 in. long; buds cylindric-clavate, ·45 in. long; flowers white, reddish at base. *Calyx* broad, thick, ·1 in. long; lobes rounded, much imbricate, obtuse, ciliate, longer than the short tube. *Corolla*-tube slender, ·5 in. long, slightly dilated near the base opposite the stamens, villous within above the stamens; lobes 1 in. long, oblong-spathulate, long-ciliate on the margins, rounded at tip. *Anthers* lanceolate, apiculate, base cordate, ·06 in. long; filaments slender, short, curved. *Ovary* broad-conical; style short, cylindric, urn-shaped at top; stigma conical, bifid, branches slender. *Fruit* not seen. *Ancyclocladus glaucinus*, Pierre in Bull. Soc. Linn. Par. nouv. sér. 98.

MALACCA: *Maingay* (K.D.) 1047. — **DISTRIB.** Borneo (*Beccari* 3335; *Haviland* 2301, 3045).

2. *WILLUGHBEIA EDULIS*, Roxb. Cor. Pl. III. t. 280 (1819), and Fl. Ind. II. 57. A large climbing shrub; bark dark brown, tubercled; branchlets slightly angled, pale brown to dark brown, prominently lenticellate; tendrils long, branched. *Leaves* chartaceous when dry; oblong or obovate-oblong, long acuminate at apex, cuneate at base; olivaceous-brown and dull on the upper surface, reddish-brown and sometimes shining on the lower; margins crispately undulate, slightly recurved; 4 to 7 in. long, 2·5 to 3·25 in. broad; midrib stout, impressed on the upper, raised on the lower surface; main nerves 12 to 16 pairs, starting at an angle of 50° to 60° with the midrib and curving upwards to anastomose near the margin; secondary nerves few, chiefly near the ends; reticulations transverse, fairly prominent; petiole ·2 to ·6 in. long. *Cymes* axillary, few-flowered, about as long as the petioles; peduncle stout, ·15 in. long; bracteoles ovate, acute, early caducous, leaving a prominent scar; pedicels short, angular; buds oblong-clavate,

about .5 in. long; flowers white or pink. *Calyx*-lobes .05 to .075 in. long, ovate, acute, ciliate; tube shorter than lobes. *Corolla*-tube cylindric, dilated in the middle opposite the stamens; lobes lanceolate, .35 to .4 in. long, ciliate on the edges. *Anthers* sub-sagittate, .05 in. long; filaments short, bent. *Ovary* conical, acute; style short; stigma conical, striate, puberulous. *Berry* large, sub-ovate, the size of a lemon; pericarp orange-coloured, thick. *Seeds* many, in a yellowish fibrous pulp; cotyledons thick, fleshy. A. DC. Prodr. VIII. 321; Kurz For. Fl. II. 165; Hook. f. Fl. Br. Ind. III. 623 (*in part*); Bl. Bijdr. 1034; Miq. Fl. Ind. Bat. II. 391. *Hunteria*?, Wall. Cat. 9066.

DINDINGS: Pangkor, at Gunong Tunggyal, *Curtis* 1629.—DISTRIB. India (Assam, Sylhet, Chittagong), Burma.

3. *WILLUGHBEIA OBLONGA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A large climbing shrub; branchlets very stout, obtusely angled, with pale greyish-brown bark rough with close-set small lenticels. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, obtuse at apex or with a short broad blunt or almost emarginate acumination, rounded at base or somewhat acute when young, almost auricled; both surfaces when dry dark reddish-brown, opaque; margins recurved; 3 to 6 in. long, 1.5 to 3 in. broad; midrib broad, flat on the upper, raised on the lower, surface; main nerves 10 to 15 pairs, irregularly spaced, the lower ones rather near together, the middle and upper ones further apart, starting at about 70° with the midrib and gradually curving upwards to anastomose near the margin; secondary nerves few and inconspicuous; reticulations many, irregularly netted; petiole stout, .25 in. long. *Cymes* small, sessile, dense-flowered, pubescent; bracteoles ovate acuminate; pedicels .05 in. long; buds oblong-clavate, .25 to .5 in. long. *Calyx*-lobes ovate-oblong, ciliate, pubescent within, .075 in. long; tube thick, short. *Corolla*-tube cylindric, .2 in. long, dilated in the middle opposite the stamens; lobes .3 to .4 in. long, linear-oblong, ciliate at the margins. *Anthers* lanceolate, apiculate, .05 in. long; filaments short, curved. *Ovary* glabrous, conical; style slender; stigma conical. *Berry* many-seeded, oblong; pericarp leathery, rough. *Seeds* ovoid, .5 in. long; testa thin; cotyledons fleshy.

MALACCA: *Maingay* (K.D.) 1089; at Ayer Panás, *Goodenough* 1396.

4. *WILLUGHBEIA CORIACEA*, Wall. Cat. 1620 (1829), and Pl. As. Rar. III. 45 (1832). A large glabrous climbing shrub; branches stout, obscurely angled, black, enlarged at the nodes; branchlets slender, angled, smooth; tendrils slender, branched. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acute or shortly and bluntly acuminate at apex, cuneate or rounded at base; glabrous and shining on both surfaces when dry especially on the upper, both surfaces reddish-brown when

dry, the upper tinged with olivaceous; margins recurved, more or less cartilaginous; 3·5 to 6 in. long, 1·5 to 2·5 in. broad; midrib stout, broad, impressed above; main nerves 10 to 12 pairs, starting at 70° with the midrib, at first straight then curving to near the margin, where they are joined by small loops, raised on the upper, raised and flattened on the lower surface; reticulations obscure, more visible on the upper surface; petiole ·3 to ·4 in. long, stout, channelled above. *Cymes* sessile, crowded, less than 1 in. long; bracteoles very small, broad, obtuse, persistent, ciliate; flowers white; buds cylindric-clavate, ·4 to ·5 in. long. *Calyx* ·15 in. long, subhemispheric; lobes rounded, obtuse, ciliate. *Corolla* thickly coriaceous; tube inflated in the middle opposite the stamens, constricted at the base and at the mouth, ·15 to ·2 in. long; lobes oblong, obtuse, ·25 in. long, the margins incurved. *Anthers* ovate-lanceolate, apiculate, ·05 in. long; filaments slender, short. *Ovary* ovoid-globular, conical, glabrous; style short, ·025 in. long; stigma cylindric-conical with a broad white annulus at its base. *Berry* obovoid, 3 in. long by 2·25 in. in diam., yellow when ripe; pericarp thick, leathery. *Seeds* red, ·75 in. long, embedded in pulp, which hardens in drying. A. DC. Prodr. VIII. 321; Hook. f. Fl. Br. Ind. III. 623; Miq. Fl. Ind. Bat. II. 391.

PENANG: on Government Hill, *Curtis* 847; *Ridley* 9359. PERAK: *Scortechini*; *King's Collector* 5331, 6976. MALACCA: *Griffith*; *Maingay* (K.D.) 1048; *Curtis* 3485; *Derry* 120, 399, 461, 1190, 1198. SINGAPORE: *Wallich* 1620; *Lobb*; *Hullett* 511, 626; *Ridley* 1641, 3594, 9501.

5. WILLUGHBEIA FIRMA, Blume Mus. Bot. Lugd.-Bat. I. 154 (1850). A large glabrous climbing shrub; branches stout, obtusely angled, bark reddish-brown or -grey, smooth, fissured; branchlets similar, nearly quadrangular, lenticellate; tendrils branched, slender. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate or elliptic-oblong, shortly and obtusely acuminate at apex, acute or cuneate at base; both surfaces glabrous, shining, the upper more or less olivaceous when dry, the lower reddish-brown; margin slightly recurved; 3 to 5 in. long, 1·25 to 2·25 in. broad; midrib stout, rather impressed above; main nerves 10 to 15 pairs, slender, starting at an angle of 70° to 75° with the midrib and at first straight then curving and branching so as almost to meet near the margin, prominent on the under, obscure on the upper, surface; secondary nerves few, between successive main nerves and at a different angle; reticulations distant, obscure; petiole ·4 to ·5 in. long, stout. *Cymes* axillary, sub-sessile, many-flowered, not much longer than the petioles; bracteoles broadly ovate, obtuse; buds oblong-clavate, ·3 to ·4 in. long, striated by the lobes of the corolla; flowers white or pale yellow. *Calyx* campanulate, ·1 to ·15 in. long; lobes half the length, ovate,

obtuse, ciliate. *Corolla*-tube cylindric, dilated in the middle opposite the stamens, .2 in. long; lobes as long as or slightly longer than the tube, linear-oblong, margins sometimes incurved, glabrous. *Anthers* ovate, acute, .03 in. long; filaments slender, short. *Ovary* ovoid, acute; style short; stigma ovate-conical with a bifid tip. *Berry* ovoid or pyriform, orange-yellow, 3 to 4 in. long, 2 to 2.5 in. broad; pericarp thick. *Seeds* embedded in pulp, red, .5 in. long or longer, elliptic-oblong, plano-concave; testa membranous; cotyledons thick. MIQ. Fl. Ind. Bat. II. 390; Hook. f. Fl. Br. Ind. III. 624; Hook. Ic. Pl. t. 2344; Stapf in Trans. Linn. Soc. Ser. 2, IV. 207. *W. Burbidgei*, Dyer in Kew Gard. Rep. 1880, 44, 46.

KEDAH: on Lankawi Island, *Curtis*. PENANG: *Curtis* 1500; *Ridley* 9468. PERAK: *Scortechini* 651, 2120; *Wray* 5, 594, 3208, 4176; *King's Collector* 6663, 10050, 10854. MALACCA: *Griffith*; *Derry* 101; *Hervey*; *Irving* 228; *Curtis* 3476. SINGAPORE: *Murton* 58; *Cantley* 95; *Ridley* 4421, 4431, 5713, 6522.—DISTRIB. Sumatra, Borneo (*Beccari* 2273; *Ridley* 9055, &c.).

This species is with difficulty distinguished from *W. coriacea*, but its leaves are less coriaceous, and the main-nerves are usually closer, and are slender and sharp instead of being broad and flattened. The fruit is edible, and the stems give a kind of gutta-percha or rubber (*Curtis*). *Curtis's* specimens bear the Malay names "Gutta Garoo," "Gutta Garok," "Getab Ujol," "Getah greep betina." The Fl. Br. Ind. gives "Gutta Singgarip," after *Murton*. As *Stapf* remarks in Hook. Ic. t. 2344, the Kew material shows that, in Borneo especially, there are varieties locally known by different names, and differing chiefly in the fruit, which ought to be studied on the spot.

*King's Collector* 7729 from Gunong Budo, Perak, at 500 to 800 ft., seems to be a large-leaved variety of this species. The leaves reach 7 in. in length and 3.5 in. in breadth; when dry they are greenish on the upper and shining brown on the lower surface. The flowers are in sessile cymes, and the corolla has oblong blunt lobes.

6. *WILLUGHBEIA MARTABANICA*, Wall. Cat. 1619 (1827), and Pl. As. Rar. III. 45, t. 272 (1832). A large glabrous climbing shrub; branches stout, dark brown; branchlets dark brown, lenticellate; tendrils long, branched. *Leaves* thinly chartaceous; oblong or ovate-oblong, or ovate-lanceolate, or obovate, shortly, bluntly and abruptly acuminate at the rounded apex, or with a short broad obtuse or emarginate point, acute or cuneate at base; both surfaces shining, the lower paler; margins recurved, undulate; 3 to 10 in. long, 1.25 to 3.5 in. broad; midrib stout, slightly channelled above, raised beneath; main nerves very many, 20 to 26 pairs more or less, parallel, at an angle of from 70° (middle) to nearly 90° (ends) with the midrib, straight to near the edge and then rather suddenly curving and anastomosing; secondary nerves very many, between and often difficult to distinguish from the main-

nerves, frequently recurrently branching; reticulations many, prominent; all more or less raised on the upper surface; petiole .25 to .5 in. long, slender. *Cymes* axillary, sessile, about twice as long as the petiole, dense-flowered; pedicels scarcely .05 in. long, pubescent; bracteoles ovate-lanceolate, sheathing the cyme-branches; buds oblong-clavate, about .5 in. long; flowers pink or orange-yellow. *Calyx* deeply lobed, nearly glabrous, .1 in. long; lobes broadly ovate, obtuse, ciliate. *Corolla*-tube cylindric, slightly dilated in the middle opposite the stamens, .175 in. long, slightly pubescent within; lobes oblong-falcate, obtuse, .3 in. long, margins sparsely ciliate. *Anthers* sagittate, the tips nearly reaching the throat of the corolla-tube; filaments slender. *Ovary* broadly ovoid, glabrous; style slender; stigma cylindric-conical. *Berry* ovoid-globose, 3 to 4 in. in diameter; pericarp orange-yellow, thick, hard, the seeds embedded in a fibrous edible yellowish pulp. *Seeds* flattened, nearly orbicular in outline; testa leathery; cotyledons thick, conform to the seed, plano-convex; radicle minute. A. DC. Prodr. VIII. 321; Kurz For. Fl. II. 165. *W. edulis*, Roxb.; Hook. f. Fl. Br. Ind. III. 623 (*in part*). *W. dulcis*, Ridley in Trans. Linn. Soc. Ser. 2, III. 319.

PENANG: *Curtis* 687. MALACCA: *Griffith*; *Goodenough* 1450. PAHANG: at Praman, near Pekan, *Ridley* 1022.—DISTRIB. Burma.

7. *WILLUGHBEIA TENUIFLORA*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 625 (1882). A large climbing shrub; branches with black bark; branchlets greyish-brown, lenticellate, striate when dry; innovations puberulous. *Leaves* thinly coriaceous, membranous when young; elliptic, elliptic-oblong or oblanceolate, sharply and somewhat abruptly acuminate at apex, cuneate at base; both surfaces glabrous and somewhat shining when dry, the upper dark olivaceous-brown, the lower bright reddish-brown; margins cartilaginous, recurved, almost revolute; 4 to 6 in. long, 1.25 to 2 in. broad; midrib slender, prominent, red; main nerves 20 to 30 pairs, very slender, the middle ones at from 70° to 80° with the midrib, the upper at a less angle, the lower nearly or quite at right angles, straight to near the margin where they branch and curve slightly, prominent beneath, less so above; secondary nerves occasional, between and similar to the main-nerves; reticulations invisible except in very young leaves; petiole .5 to .6 in. long, channelled above. *Cymes* axillary, about twice as long as the petioles, densely crowded with many short few-flowered branches, rusty-puberulous like the calyx, pedicels and bracteoles; bracteoles ovate, acute, deciduous; pedicels .05 to .1 in. long; buds oblong-clavate, elongate, reaching nearly 1 inch; flowers white. *Calyx* campanulate; lobes ovate, obtuse, ciliate, 1 in. long. *Corolla*-tube narrowly cylindric with a nearly globular dilatation close above the base and opposite the stamens,

·4 in. long, villous within above the stamens; lobes ·4 to ·7 in. long, oblong-falcate, obtuse. *Anthers* cordate-lanceolate, ·075 in. long; filaments slender, puberulous, bent close to the back of the connective and there attached to a broad swelling. *Ovary* hemispheric, top nearly truncate; style short, thick, ellipsoid; stigma conical. *Berry* 4 in. long, "pyriform, abounding in caoutchouc; pericarp thick, leathery; seeds many, naked; cotyledons pink, fleshy" (*Maingay*).

PERAK: *Ridley* 3075; *Wray* 3773. DINDINGS: *Curtis*. MALACCA: *Griffith*; *Maingay* (K.D.) 1049; *Curtis* 3484; *Hervey*; *Cantley* 105; *Goodenough* 1785. SINGAPORE: *Ridley* 11333. — *DISTRIB.* Sumatra (*van Romburgh* 469).

*Curtis* says that the caoutchouc of this species is of no use. *Wray* No. 3773 is a specimen in young fruit; the fruits terminal! but otherwise like other specimens. The apparently terminal fruits probably arose from the cymes of the uppermost axils, the much enlarged pedicels having absorbed the rest of the small inflorescence or caused it to fall. The Sumatra specimen has a less puberulous inflorescence, but otherwise does not seem to differ.

8. *WILLUGHBEIA FLAVESCENS*, *Dyer* in *Herb. Kew.*; *Hook. f. Fl. Br. Ind.* III. 625 (1882). A slender climbing shrub, all parts glabrous; bark dark grey, rough, with large elliptic lenticels; branchlets dull greyish- or reddish-brown when dry, obtusely angled, the nodes swollen, bases of fallen leaves tuberculate. *Leaves* coriaceous; elliptic, shortly and bluntly acuminate at apex, rounded or sometimes shortly cuneate at base; both surfaces glabrous, the upper dark greenish-brown, the under pale reddish-brown when dry; margins cartilaginous, recurved; 2·5 to 4·5 in. long, 1·25 to 2·25 in. broad; midrib stout, impressed above; main nerves slender, 16 to 20 pairs, rather irregular in angle and spacing, usually at from 70° to 80° with the midrib, and curving gently to and along the margin, raised beneath; secondary nerves many, between the main-nerves and similar to them; reticulations very oblique, sometimes nearly parallel to the nerves, raised beneath; petiole ·4 to ·6 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, sessile, as long as or up to twice as long as the petioles, dichotomous; branches slender; pedicels ·1 in. long; bracteoles minute, acute; buds conoidal at tip, ·2 to ·3 in. long. *Calyx* ·06 in. long, campanulate, with 5 deep ovate, acute, ciliate lobes. *Corolla* hypocrateriform; the tube elliptic-ovoid ·15 in. long, mouth much constricted; lobes ovate-falcate, acute, recurved in flower, ·15 in. long, margins involute. *Stamens* near the apex of the tube, included, ovate; filaments short, geniculate. *Ovary* elliptic-ovoid, glabrous, narrowed into the ·075 in. long slender style, which is obconic at top; stigma small, cylindric, rounded at tip.

Berry yellow or greenish-yellow turning to red, ovoid-cordate or nearly globose; 3 to 4 in. in diam.; pericarp thick, coriaceous, smooth. *Seeds* few, large, embedded in pulp, elliptic, about .6 in. long by .4 in. broad; testa membranous; cotyledons plano-convex, thick; radicle minute. *Chilocarpus flavescens*, Kew Gard. Report, 1880, 47. *Urnularia flavescens*, Stapf in Hook. Ic. Pl. t. 2711, p. 2.

PERAK: *King's Collector* 7286, 7848. PROVINCE WELLESLEY: *Ridley* 9389. MALACCA: *Hervey*. SINGAPORE: *Murton* 120; *Ridley* 6936, 10123; *Cantley* 52.

We do not propose to separate "*Urnularia*" from "*Willughbeia*." Dr. Stapf has kindly explained that he proposed the new genus under the belief that the seeds were albuminous, which, however, he finds now they are not. The mistake arose from a fruit of another *Apocynacea*, presumably one-half of a foliole of a species of *Rejoua*, having been mixed up with the flowering specimens of *Urnularia ovatifolia*.

9. *WILLUGHBEIA RUFESCENS*, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 626 (1882). A large climbing shrub, glabrous; branches dark greyish-brown, swollen at the nodes, obtusely angled, rough; branchlets cinereous-brown when dry, slender. *Leaves* coriaceous; elliptic-oblong or -lanceolate, very obtusely short-acuminate at apex, cuneate or rounded, often unequally, at base; glabrous on both surfaces, olivaceous-brown and shining above, dull and reddish-brown beneath; margins recurved; 2 to 4 in. long, .5 to 1.5 in. broad; midrib stout, deeply impressed above, raised beneath; main nerves 20 to 25 or more (the apex ones very close and difficult to count) pairs, at an angle of about 75° with the midrib, straight to near the margin where they curve; secondary nerves many, between the main nerves and similar to them, reticulations oblique; all faint on the upper, rather thick and distinct on the lower surface; petiole .2 to .3 in. long. *Cymes* axillary, sessile, slightly longer than the petioles with few slender short lax few-flowered branches; bracteoles minute, ovate; pedicels .2 in. long, slender; buds linear-oblong, .25 in. long; flowers yellow. *Calyx* under .1 in. long, deeply lobed; lobes broadly ovate, subacute, ciliate on the margins. *Corolla* hypocrateriform; tube ellipsoid, glabrous, .15 in. long; lobes narrowly oblong, obtuse, erect when open, .15 in. long, margins incurved. *Anthers* ovate, apiculate; filaments geniculate, slender, inserted below the middle of the tube. *Ovary* broadly ovoid, as long as the calyx; style short, .06 in. long, ending in an obconic top; stigma narrow, cylindric. *Berry* (immature) globose, 1.5 to 2 in. in diam.; pericarp thick, leathery, smooth. *Seeds* embedded in pulp.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1092; *Hervey*. PROVINCE WELLESLEY: at Krian, *Ridley* 9389. SINGAPORE: *Ridley* 3996, 6023, 6047, 6143.—DISTRIB. Sumatra (*Forbes* 3232).



2. CHILOCARPUS, Blume.

Sarmentose or scandent woody shrubs. *Leaves* coriaceous or chartaceous, opposite, petiolate, penninerved, the main-nerves numerous, nearly at right angles to the midrib, sometimes indistinct. *Flowers* usually small, slender, in dense axillary cymes or terminal or axillary trichotomous panicles; pedicels enlarged in fruit. *Calyx* 5-partite, the lobes short, glands none. *Corolla* hypocrateriform; the tube cylindric, slightly dilated at the insertion of the stamens, the throat without scales; lobes 5, short, broad, twisted, overlapping to the left, twisted to the right. *Stamens* inserted at or below the middle of the tube, included; anthers lanceolate, acute, the cells rounded at the base, inappendiculate. *Disk* none. *Ovary* entire, 1-celled, with 2 parietal prominent multi-ovular placentas; style short; stigma conical or ovoid, faintly bifid; ovules 2- or many-seriate on each placenta. *Fruit* a fleshy berry, ultimately bivalved, dehiscent; pericarp thick. *Seeds* embedded in pulp with fibrous and corky arils, numerous, compressed or thick, often grooved near the hilum; either with thin testa and horny albumen, or with thick granular testa and thin albumen, albumen equable or ruminant; cotyledons flat sub-foliaceous, broad or narrow; radicle elongate, terete.—DISTRIB. India, Burma, Malay Archipelago and Peninsula, and tropical Australia; species about 16 to 18.

The nature of the corky processes which we call “arils” above is a little difficult to understand. They are well shown in the excellent figure of the fruit of *C. suaveolens*, Bl., in t. liii. in Blume Mus. Bot. Lugd.-Bat. I., but the author gives no explanation of his drawings. We prefer to use the word aril, as it seems to us the most explanatory. When the fruits and seeds of all the species are known, it may be possible to make two genera, or, at any rate, two subgenera, according to the testa and albumen.

Flowers small, corolla-tube under .3 in. long (where known); leaves medium-sized or small, nerves not very prominent:—

Flowers in terminal or axillary cymes as long as or longer than the leaves:—

Flower-pedicels without imbricate bracteoles, only bracts at the bases of the pedicels; secondary nerves of the leaves recurrently branched:—

Leaves 2.25 to 3 in. long, thinly coriaceous; main nerves many, easily visible when dry; peduncles under 1 in. long; seeds with thin testa and horny albumen ..

1. *C. atro-viridis*.

Leaves 3 to 5 in. long, chartaceous; main nerves many, not easily seen when dry; peduncles over 1.5 in. long; seeds not known .. .. .

2. *C. embelioides*.

Flower-pedicels with many imbricate bracteoles; seeds with the testa thick and granular and the albumen thin; secondary nerves of the leaves not recurrently branched ..

3. *C. decipiens*.

Flowers in axillary cymes much shorter than the leaves; flower-pedicels with imbricate bracteoles:—

Leaves coriaceous, more or less obovate:—

Cymes nearly sessile; leaves obtuse at the apex; fruit-pericarp usually tubercled without; seeds with thin testa and horny albumen .. .. . 4. *C. enervis*.

Cymes on peduncles nearly .5 in. long; leaves shortly apiculate; fruit unknown:—

Leaves coriaceous, upper surface dull brown, lower pale when dry; main nerves nearly at right angles to the midrib; corolla-lobes rhomboid-falcate .. .. . 5. *C. Cantleyi*.

Leaves chartaceo-coriaceous, upper surface nearly black shining, lower dark greyish-brown when dry; main nerves at about 75° with the midrib; corolla-lobes linear-falcate .. .. . 6. *C. nigrescens*.

Leaves scarcely coriaceous, oblong-lanceolate; fruit 2 to 2.5 in. long, about 1 in. broad; seeds with granular testa and thin fleshy albumen .. .. . 7. *C. minutiflorus*.

Flowers rather large, corolla-tube .7 to 1 in. long; leaves large, nerves very prominent; seeds with thin testa and horny albumen .. .. . 8. *C. costatus*.

1. *CHILOCARPUS ATRO-VIRIDIS*, Blume Mus. Bot. Lugd.-Bat. I. 153 (1850). A glabrous slender climbing shrub; young branches not much thicker than a crow-quill, pale brown, terete, sparsely lenticellate, swollen at the nodes. *Leaves* thinly coriaceous; narrowly elliptic-oblong or -lanceolate, shortly and bluntly caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, dull when dry, the upper pale brown, the lower yellowish, punctulate; margins thinly cartilaginous, slightly recurved, crispate; 2.25 to 3 in. and even 5 in. long, .5 to 1.25 in., even 1.75 in., broad; midrib prominent, impressed above; main nerves very numerous, parallel, irregularly spaced, about 25 to 30 pairs; at an angle of about 75° with the midrib, straight to the margin to meet an intramarginal looped nerve very close to it (under .05 in.); secondary nerves very many, between the main nerves, recurrent from the marginal nerve and branched backwards, the branches forming the only visible reticulations; petiole .3 to .4 in. long, slender. *Cymes* very slender, terminal and axillary, reaching 2 to 4 in. in length, trichotomous; peduncles .5 to 1 in. long, flattened; branch peduncles slender, nearly as long; ultimate cymules corymbose or subumbellate; pedicels slender, .1 to .15 in. long; bracts leafy, caducous, one or two always at the base of each pedicel minute and scarious; buds clavate, .2 in. long, tip globose; flowers deep yellow. *Calyx* campanulate, under .1 in. long; lobes ovate-obtuse, margins hyaline. *Corolla*-tube short, .1 to .15 in. long, dilated in the middle opposite the stamens, glabrous except a ring of hair within below the stamens; lobes .1 in. long, falcate, broadly

notched on one side, recurved when open, acute at tip. *Anthers* very small, under .05 in. long; filaments scarcely any, pubescent. *Ovary* conoidal; style slender .05 in. long; stigma oblong, apiculate; ovules many. *Berry* ovoid, 1.75 in. long, 1.25 in. in diam., dehiscent in 2 concave valves; pericarp thick, hard, woody, smooth and yellow without. *Seeds* numerous, black, .35 in. long, .3 in. broad, oblate-globose, deeply grooved at the hilum, about one-third surrounded by an aril consisting of yellow angular corky masses and a tuft of minute net-like fibres; testa shining, thin, granular; albumen thick, horny; cotyledons ovate, obtuse, somewhat cordate, flat, .225 in. long; radicle slender, .15 in. long. Miq. Fl. Ind. Bat. II. 393; Hook. f. Fl. Br. Ind. III. 626. *Hunteria* ? *atro-viridis*, Wall. Cat. 1614; A. DC. Prodr. VIII. 351. *Winchia atro-viridis*, Kurz For. Fl. II. 170.

PERAK: on Maxwell's Hill, *Scortechini* 321; at 2,500 to 3,000 feet, *King's Collector* 6303, 8317. SELANGOR: at Batang Barjuntai, *Ridley* 7563; at Kent Estate 8557 (flowers white).—DISTRIB. Tavoy, Mergui.

We do not quote "Malabar" in the distribution because we think that *Chilocarpus malabaricus*, Bedd. Ic. Pl. Ind. Or. t. 175, is probably distinct from *C. atro-viridis*.

2. *CHILOCARPUS EMBELIOIDES*, King & Gamble, n. sp. A climbing shrub; branchlets slender, pale dull brown, almost smooth. *Leaves* chartaceous; elliptic-oblong, shortly acuminate at apex, narrowed somewhat unequally at base; glabrous on both surfaces and dull, the upper olivaceous when dry; margins pale, thin, crispate; 3 to 5 in. long, 1.25 to 2 in. broad; midrib slender, prominent on the lower, somewhat impressed on the upper, surface; main nerves 24 to 26 pairs, very slender, at an angle of 70° with the midrib, straight, meeting close to the margin a slender faint intramarginal nerve; secondary nerves alternate with the main nerves and joining both the intramarginal nerve and midrib, branched recurrently; reticulations obscure; petiole .2 to .4 in. long, slender, slightly rugose. *Cymes* axillary, lax, many-flowered, nearly as long as the leaves; peduncles slender, 1.5 to 1.75 in. long; branches trichotomous slender, about 1 in. long; ultimate cymules subumbellate; pedicels slender .15 in. long; bracts very small, ovate, acute, at the bases of the rachis-branches and pedicels; buds very short, clavate, tip globose. *Calyx* campanulate, .05 in. long; lobes very small, rounded, with hyaline, ciliate margins. *Corolla*-tube cylindric, .1 in. long, slightly constricted at the base and the naked throat, glabrous except for a ring of white villous hairs below the stamens; lobes broad, ovate-falcate, acute, .05 to .1 in. long. *Stamens* inserted a little above the middle of the tube; anthers lanceolate, apiculate; filaments very short. *Ovary* conical, attenuated into a short style just reaching the

stamens; stigma conical. *Berry* (immature) globular, smooth when fresh, wrinkled when dry. *Seeds* embedded in pulp.

PERAK: at Haram, *Scortechini* 711.

3. *CHILOCARPUS DECIPIENS*, Hook. f. in Fl. Br. Ind. III. 627 (1882). A glabrous slender climbing shrub; young branches twice as thick as a crow-quill, terete, dull brown when dry, with numerous elongate pale lenticels, swollen at the nodes. *Leaves* thinly coriaceous; narrowly elliptic-oblong or -lanceolate, obtusely and often obliquely long acuminate at apex, cuneate at base; glabrous on both surfaces and olivaceous-brown, the lower paler and minutely dotted; margins slightly recurved, crispate; 3 to 3.5 in. long, 1 to 1.5 in. broad; midrib prominent, pale, channelled above; main nerves 20 to 25 pairs, slender, parallel, at about 75° to 80° with the midrib, straight to the margin, close to which they join an intramarginal nerve, visible on both surfaces; secondary nerves many, usually alternate with the main nerves, also running to the intramarginal one, occasionally branched, but not recurrently; petiole slender, .25 in. long. *Cymes* terminal and axillary, 2 to 3-chotomous, forming a terminal leafy panicle up to 9 in. long and 6 in. broad; main peduncles 1 to 1.25 in. long, successive branches gradually shorter; ultimate cymules subumbellate; pedicels stout, covered with minute bracteoles spirally arranged, up to .2 in. long; bracts leafy caducous, those at the bases of the branches and pedicels ovate acute, sheathing, with pale margins; flowers not known. *Berry* linear-oblong, cylindric, 2.5 in. long by nearly 1 in. broad, on a stout many-bracteolate pedicel and calyx of ovate acute lobes, splitting when ripe; pericarp woody, minutely granular, green when fresh, reddish-brown when dry, nearly .1 in. thick. *Seeds* of various shapes, about .5 in. long; partly enclosed in a corky aril with fibres at its base; testa granular, deeply furrowed as is the thin fleshy albumen; cotyledons flat, nearly orbicular, .15 in. long; radicle .1 in. long.

PERAK: at Ulu Bubong, in dense jungle at 300 to 600 feet, *King's Collector* 10017, 10268. MALACCA: *Maingay* (K.D.) 1043, 1060. SELANGOR: on Kent Estate, *Ridley* 8557.

4. *CHILOCARPUS ENERVIS*, Hook. f. Fl. Br. Ind. III. 626 (1882). A stout woody glabrous climbing shrub; branchlets as thick as or thinner than a goose-quill, pale brown when dry, obtusely angled, the nodes raised and marked by a ridge; terminal buds resinous. *Leaves* coriaceous; narrowly obovate or oblanceolate, rounded or very briefly apiculate or sometimes shallowly emarginate at apex, long cuneate at base; both surfaces shining, the lower very pale when dry and often minutely punctulate; the margin slightly cartilaginous, recurved; 3 to 5 in. long, 1.25 to 2 in. broad; midrib stout, prominent beneath,

channelled above; main nerves numerous, about 25 to 30 pairs, at about 80° with the midrib, faint on the upper surface, invisible on the lower; secondary nerves nearly as many as and between the main nerves, reticulations not visible; petiole .5 to .75 in. long, usually twisted. *Cymes* small, in dense axillary clusters, shorter than the petiole; pedicels very short, thick, spirally corrugated by the scars of fallen bracteoles, very much thickened in fruit; buds clavate, the tip globose; flowers minute, white. *Calyx* .05 in. long or less, deeply divided in 5 ovate, hyaline, puberulous, rounded lobes. *Corolla*-tube cylindric, slender, .3 in. long, inflated about one-third of the way up, opposite the stamens; throat naked; lobes obliquely falcate, apiculate on one side, .1 to .15 in. long. *Anthers* lanceolate, very small, rounded at the base; filaments very short. *Ovary* ovate, acuminate; stigma small, conoidal; placentas prominent. *Berry* orange-coloured, ellipsoid or obovoid, 1.5 to 2 in. long and 1 to 1.5 in. broad; pericarp thick, fleshy, smooth or much corrugated and tubercled externally, woody, dividing into two concave or flat valves. *Seeds* embedded in a fibrous pulp and enclosed in a pale orange corky lobed arillus on one side, .4 in. long, oblong or ovoid, sometimes flattened at the ends, deeply grooved at the hilum; testa black, shining, thin; albumen horny, thick; cotyledons flat, orbicular-cordate, .2 in. in diameter; radicle .1 in. long.

PERAK: at Thaipeng, Kalan Tujur, &c., *Wray* 593, 1118, 1804, 4026; *Scortechini* 189; *King's Collector* 3203, 3786, 7532, 8328, at 100 to 500 feet; *Cantley* 25. MALACCA: *Maingay* (K.D.) 1044.

5. *CHILOCARPUS CANTLEYI*, King & Gamble, n. sp. A glabrous climbing shrub; young branches as thick as a goose-quill, smooth, at first yellowish afterwards dark brown, obtusely angled, raised at the nodes and ridged. *Leaves* coriaceous; elliptic or oblanceolate, the apex obtuse or with a short blunt apiculus, long-attenuate at base; both surfaces dull when dry, the upper dark greenish-brown, the lower very pale greenish-yellow when fresh, punctulate; margins slightly recurved; 3.5 to 4 in. long, 1.25 to 1.5 in. broad; midrib thick, channelled above, broad and conspicuous beneath; main nerves extremely faint on the upper surface when dry, invisible on the lower, apparently about 30 pairs at nearly right angles with the midrib and with many intermediate secondary nerves; petiole about .6 in. long, channelled above. *Cymes* axillary, glabrous, on stout somewhat flattened peduncles .4 to .5 in. long, many- (about 20-) flowered, few-branched; pedicels .1 in. long, with many obtuse imbricate bracteoles which are caducous and leave rough pits behind; buds clavate, the tip obtuse; flowers yellow. *Calyx* .075 to .1 in. long, lobes elliptic-rotund, thick with hyaline margins. *Corolla*-tube cylindric, .2 in. long, dilated slightly below the middle opposite the

stamens, constricted at throat; glabrous within except at the base; lobes .15 to .2 in. long, broadly rhomboid-falcate, plicate in bud. *Stamens* in the dilated part of the tube; anthers lanceolate, rounded at base, .05 in. long; filaments slender, pubescent below, as long as anthers. *Ovary* ovate, compressed, tapering to a .075 in. long style with short subglobular stigma. *Fruit* not known.

PERAK: near Ulu Kerling, 500 to 700 feet, *King's Collector* 8823; swamps in lower Perak, *Cantley* 227. SELANGOR: at Kwala Lumpor, *Ridley* 2839; *Curtis* 2354.

Curtis's specimen has more narrowly lanceolate leaves and a rather longer apiculus, with more slender branches, and has also, with Ridley's specimen, shorter peduncles to the inflorescence, but they seem both to be correctly this species, which comes very near to *C. enervis*, but has much less slender flowers and larger inflorescence.

6. *CHILOCARPUS NIGRESCENS*, King & Gamble, n. sp. A glabrous climbing (?) shrub; branchlets rather stout, nearly black, terete, the nodes somewhat swollen and usually ridged. *Leaves* chartaceo-coriaceous; elliptic-oblong or -oblanceolate, shortly and abruptly blunt-acuminate at apex, cuneate at base, often from nearly the middle of the blade; upper surface shining, nearly black when dry, lower a little paler and greyish-brown, minutely punctulate; margins slightly recurved; 3 to 5 in. long, 1.5 to 2 in. broad; midrib rather slender, slightly impressed above, raised beneath; main nerves 12 to 16 pairs at an angle of about 75° with the midrib, nearly straight to meet an arching intramarginal nerve at about .1 in. from the edge, faint on both surfaces; secondary nerves many, often recurrently branched; reticulations obscure; petiole .5 to .6 in. long. *Cymes* axillary, up to 1.5 in. long, more or less pyramidal, crowded; peduncle stout, flattened, .3 to .5 in. long; branches 3-chotomous, short; cymules subumbellate; pedicels about .15 in. long, densely strobilate with imbricate, rounded, pale-margined bracteoles; the bracts at the bases of the branches acute and sheathing; buds clavate, .4 in. long, the tip globose. *Calyx* campanulate, .05 to .075 in. long; lobes rather deep, broadly ovate, rounded, minutely ciliate. *Corolla*-tube narrowly cylindric, dilated at about one-third of the height from the base opposite the stamens, contracted at the naked mouth, glabrous without, slightly puberulous below the stamens within; lobes linear-falcate, acuminate, much twisted, about .2 in. long. *Stamens* inserted below the middle of the tube; anthers lanceolate, apiculate, rounded at base, .05 in. long, as long as the slender curved filaments. *Ovary* conoidal, glabrous, style slender, obconic above; stigma conical. *Berry* not known.

PERAK: on Government Hill and West Hill, *Curtis* 1040, 1121, 3086.

The same number, "*Curtis* 1040," is quoted by D. Oliver in Hook. Icon. t. 1758 (1888) as the type of *Melodinus coriaceus*, Oliver, but all our specimens have more or less the imbricated bracteoles of *Chilocarpus*, and are destitute of scales in the throat of the corolla, or of laciniae to its lobes. A comparison of the specimens of *Melodinus coriaceus* in the Kew Herbarium shows clearly that two species have been given the same number, but that the resemblance is superficial only. The real *M. coriaceus* has the leaves pale brown, and not black, when dry.

7. *CHILOCARPUS MINUTIFLORUS*, King & Gamble, n. sp. A glabrous climbing shrub; young branches thicker than a crow-quill, obtusely angled, striate, with thin scaly bark, pale when dry; nodes swollen, joined by a ridge. *Leaves* thinly coriaceous, elliptic or oblong-lanceolate, shortly obtusely-acuminate at apex, narrowed or almost rounded at base; upper surface green, lower waxy-white when fresh, both pale greenish-yellow when dry; margins slightly recurved; 2 to 2.5 in. long, .75 to 1.25 in. broad; midrib slender, prominent beneath; main nerves 9 to 12 pairs, at an angle of about 65° with the midrib, straight, joined at about .05 in. from the margin in an obscure intramarginal nerve, faint on both surfaces or sometimes not distinguishable; secondary nerves present, but, like the reticulations, not easily visible; petiole slender, .15 to .2 in. long. *Cymes* axillary, few-flowered, scarcely exceeding the petioles; peduncles very short, as are the branches and pedicels, which are sometimes enlarged and bear many imbricate bracteoles; bracts ovate-acute, sheathing; buds clavate, .15 in. long, the tip globose; flowers white or yellow. *Calyx* campanulate, .05 in. long, lobes very small. *Corolla*-tube inflated in the middle opposite the stamens, constricted above and below, .1 in. long, glabrous except a ring of hairs under the stamens within; lobes ovate falcate, acuminate, about .2 in. long. *Anthers* ovate-lanceolate, .05 in. long, nearly sessile. *Ovary* ovoid, tapering into a short style with conical tip. *Berry* on a stout pedicel, narrowly obovoid or pyriform, surmounted by a mamillate apex, splitting into 2 valves marked by slight vertical ridges; 2 to 2.5 in. long, .75 to 1.25 in. broad; pericarp thick, woody, dull green with specks when fresh, yellowish when dry. *Seeds* numerous, oblong, angular, .25 in. long, embedded in pulp and partly enclosed in a papery aril, sulcate at the hilum; testa granular, dark brown; albumen thin, fleshy; cotyledons ovate.

PERAK: *King's Collector* 5368, 5494, 7550, in dense jungle.

No. 5368 has broader leaves than the rest and pedicels with imbricating bracteoles, which the others only show a tendency to, but we see no reason to keep it separate.

8. *CHILOCARPUS COSTATUS*, Miq. Fl. Ind. Bat. II. 393 (1856). A stout climbing shrub; young branches as thick as a goose-quill, shining and purplish-brown when dry, sometimes obtusely angular, nodes swollen. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and very obtusely acuminate at apex, attenuate at base or sometimes rounded; both surfaces glabrous, upper shining, when dry the upper greenish- or dull purplish-brown, the lower yellowish-brown; margins recurved; 4 to 8 in. long, 2 to 3·5 in. broad; midrib stout, broad above and impressed, sharply angled beneath when dry; main nerves 12 to 20 pairs, nearly parallel, very conspicuous, impressed on the upper, raised on the lower surface, starting at an angle of from 65° to 75° with the midrib and gradually curving to join in a prominent intramarginal slightly looped nerve ·05 to ·1 in. from the margin; secondary nerves many, usually alternate with the main nerves but sometimes at irregular angles with the midrib, recurrent from the intramarginal nerve and branching backwards; reticulations few, oblique, inconspicuous; petiole ·5 to 1 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, puberulous, trichotomous, reaching about 3 in. in length and breadth, many-flowered, apparently whorled; peduncles ·5 to 1·5 in. long, stout, flattened; branch peduncles ·3 to ·6 in. long, these again branched; ultimate cymules subumbellate; pedicels ·1 to ·15 in. long; bracts caducous; bracteoles ovate acuminate, grey-puberulous, the margins hyaline, at the bases of the pedicels; buds clavate with globose tips, ·75 in. long; flowers yellowish. *Calyx* campanulate, ·075 in. long; lobes ovate, rounded, margins hyaline minutely ciliate. *Corolla*-tube very slender, ·7 to 1 in. long, dilated a little above the base opposite the stamens, pubescent at the base within, otherwise glabrous; lobes ovate-lanceolate, acuminate, reaching ·5 in. long and about ·25 in. broad. *Anthers* lanceolate, ·075 in. long, cells rounded at base; filaments slender, as long as anthers, villous at base. *Ovary* ovate, acuminate, compressed, smooth, glabrous; style slender, ·1 in. long; stigma ovoid, apiculate. *Berry* large, ovoid when young, elliptic when ripe, with a smooth boss at the apex, and flattened base; 2·5 to 3 in. long, 1·5 to 2 in. broad; pericarp thick, orange-yellow, smooth. *Seeds* embedded in fibrous pulp and half surrounded by a fleshy yellow arillus, oblong-subquadrate, deeply channelled at the hilum; testa thin, brown; albumen thick, horny; cotyledons ovate-orbicular, flat; radicle short. *C. Maingayi*, Dyer; Hook. f. Fl. Br. Ind. III. 627.

PENANG: at Ayer Etam, *Curtis* 475. PERAK: at Sungie Larút, *Wray* 2428; *Scortechini*; *King's Collector* 3261, 5264, 10848. PAHANG: *Ridley* in Trans. Linn. Soc. Ser. 2, III. 319 (*C. Maingayi*). MALACCA: *Maingay* (K.D.) 1045, 1046; *Curtis* 3479. SELANGOR: *Ridley* 2726.



We are unable to separate *C. Maingayi* from *C. costatus*. Teysmann's specimen of the latter in the Kew Herbarium has only immature flower-buds, rather smaller than the buds of *C. Maingayi*, but some of our specimens have them in quite as immature a stage. Curtis says it gives a very white rubber.

### 3. LEUCONOTIS, Jack.

Erect or climbing shrubs. *Leaves* opposite, distantly penninerved. *Flowers* in pedunculate axillary cymes, 4-merous. *Calyx* 4-lobed or -partite, thickened at the base, eglandular or minutely glandular within. *Corolla* hypocrateriform; tube slightly dilated in the middle opposite the stamens, throat naked; lobes 4, short, overlapping to the left. *Stamens* 4, included in the tube; anthers linear-lanceolate, the cells rounded at the base. *Disk* none. *Ovary* 2-celled; style short; stigma thickened, with a very short bifid apiculus; ovules 2 to 3 in each cell, axile, laterally affixed. *Fruit* an ovoid or globose berry, pulpy within. *Seeds* 1 to 6, ovoid-oblong; testa membranous; albumen none; cotyledons thick fleshy, the inner surfaces irregular; radicle short. — **DISTRIB.** Malay Peninsula and Archipelago; about 6 species.

Calyx 4-partite, lobes long linear; intramarginal nerve of leaves very prominent; ovules 3 in each cell; seeds up to 6 . . . 1. *L. eugenifolius*.

Calyx 4-lobed, lobes short rounded; intramarginal nerve obscure; ovules 2 in each cell; seeds usually 2:—

Corolla-tube .25 in. long; peduncles very stout; calyx and bracteoles very thick fleshy; berry obovoid . . . 2. *L. Maingayi*.

Corolla-tube .3 to .4 in. long; peduncles rather thick; calyx and bracteoles moderately large and thick; berry ellipsoid . . . 3. *L. Griffithii*.

1. **LEUCONOTIS EUGENIFOLIUS**, A. DC. Prodr. VIII. 331 (1844). A small erect or climbing shrub; branchlets thinner than a goose-quill, dark-rusty-puberulous at first, afterwards glabrous, obscurely angled. *Leaves* chartaceous; elliptic-oblong, sometimes oblanceolate, abruptly and often obliquely obtuse-caudate-acuminate at apex, rounded at base or sometimes slightly cuneate; upper surface dull olivaceous-brown, lower surface pale yellowish-brown, minutely punctate and rusty-puberulous on the nerves; 2.5 to 4.5 in. long, 1 to 2 in. broad; main nerves 8 to 10 pairs, very prominent on the lower surface, at right angles to the midrib, straight to join in a conspicuous intramarginal nerve at nearly .1 in from the edge, the said nerve joining the midrib below the acumen; secondary nerves usually 1 or 2 between the main nerves, reticulations obscure; petiole slender, .3 to .5 in. long, rusty-pubescent. *Cymes* 1 to 1.5 in. long, erect, rusty-pubescent, usually about 6- to 12-flowered; peduncle .5 in. long; branches 3, the side ones few-flowered, the mid one usually again branched; pedicels about .2 to

·3 in. long; bracts leafy, linear or spathulate, ·5 to 1 in. long; bracteoles linear, obtuse at tip, similar to calyx-lobes; buds clavate, the tip ovoid; flowers yellowish. *Calyx*-tube very short; lobes linear, ·2 in. long, pubescent and with few hispid hairs near the obtuse tip, slightly recurved; glands few, minute. *Corolla*-tube ·3 to ·4 in. long, glabrous except near the base inside; lobes ·15 to ·2 in. in diameter, ovate-cordate, densely pubescent, the margins incurved. *Anthers* 4, linear-lanceolate, apiculate, ·15 in. long; filaments ·05 in. long, slender, decurrent in the tube. *Ovary* conoidal, more or less 4-angled, glabrous or pubescent; style slender, ·125 in. long; stigma globose, apiculus bifid; cells 2, ovules 3 in each cell. *Berry* ovoid, about 1·25 to 1·5 in. long and 1 in. in diameter; pericarp leathery, shining without, wrinkled when dry, pulp very scanty, septum thin. *Seeds* up to 6, ovoid-oblong, ·6 in. long by ·35 in. broad, slightly grooved at the hilum; testa membranous, brown; cotyledons very thick, unequal. Miq. Fl. Ind. Bat. II. 397; Hook. f. Fl. Br. Ind. III. 628. *L. cuspidata*, Blume Mus. Bot. Lugd.-Bat. I. 112; Miq. l.c. 398. *Melodinus* ? *eugenifolius*, Wall. Cat. 1616.

KEDAH: *Cantley* 230. PENANG: *Wallich* 1616; *Curtis* 1061; *King's Collector* 996A, 1452. PERAK: *Curtis*; *Wray* 629, 630, 3141, 4248; *Scortechini* 1281. SINGAPORE: *Ridley* 2724. — DISTRIB. Sumatra (*Teysmann* 4053; *Beccari* 844; *Curtis* 3551; *Forbes* 1586, 2725), Borneo (*Burbridge*, *Beccari* 3246).

2. *LEUCONOTIS* MAINGAYI, Dyer in Herb. Kew.; Hook. f. Fl. Br. Ind. III. 628 (1882). A climbing shrub; branchlets stout, nearly as thick as a goose-quill, nearly black when dry, obtusely quadrangular, the nodes swollen and crossed by a slender ridge joining the bases of the petioles. *Leaves* opposite or in whorls of 3, coriaceous; elliptic-oblong, abruptly and obtusely caudate-acuminate at apex, attenuately rounded at base; shining on the upper surface and very dark brown when dry, paler and dull on the lower; margins recurved; 3 to 5 in. long, 1·5 to 2 in. broad; midrib strong, channelled above, raised beneath; main nerves 6 to 10 pairs, the lowest very near the margin and starting the rather obscure intramarginal looped nerve, to which the others, which start from the midrib at about 60°, gradually curve; secondary nerves none or very few; reticulations obliquely transverse, rather prominent; petiole 1·25 in. long, channelled above by the decurrent margins of the blade, which become connivent. *Cymes* very stout, about as long as the petiole, about 15- to 20-flowered; peduncle very thick, flattened, ·25 to ·5 in. long and ·15 to ·25 in. broad, much enlarging in fruit; branches about 4, these again 2-chotomously branched, very stout, as are the very short (up to ·15 in. long) pedicels; bracts ovate-acute, clasping the branches and bases of the pedicels; buds clavate, the tip conical.

*Calyx*-tube very short, fleshy; lobes 4, ovate, rounded, the two outer broader and shorter than the two inner, which are .2 in. long, all glabrous but very slightly ciliate; glands very many, very minute, in bud scarcely more than papillæ. *Corolla*-tube cylindric, .25 in. long, puberulous at the base within; lobes 4, broadly ovate, recurved, thickly puberulous, the margins incurved slightly. *Stamens* in the upper half of the tube; anthers lanceolate, apiculate, .125 in. long; filaments short, broad. *Ovary* somewhat depressed, 4-grooved, tapering to a broad .1 in. style; stigma rounded with a short apiculus; cells 2, ovules 2 in each cell. *Berry* obovoid, 1.5 to 1.75 in. long by about 1 in. in diam.; pericarp thick, smooth and shining without. *Seeds* about 3, oblong, somewhat flattened, .75 in long by .5 in. broad and .25 in. thick, dark brown; testa very membranous; cotyledons thick, fleshy; radicle cylindric, about .15 to .2 in. long.

SINGAPORE: *Maingay* (K.D.) 935; *Ridley* 2826, 3710, 8908.

3. *LEUCNOTIS GRIFFITHII*, Hook. f. in Fl. Br. Ind. III. 628 (1882).

A glabrous climbing shrub; branchlets stout, as thick as a goose-quill, obscurely angled, dark brown when dry with a few pale lenticels, ultimate ones quadrangular. *Leaves* coriaceous; elliptic-oblong, obtusely and abruptly short acuminate at apex, rounded or slightly cuneate at base; upper surface shining, pale olivaceous-brown when dry, lower dull and paler chocolate-brown, often glandular-dotted; margins recurved; 3.5 to 5.5 in. long, 1.5 to 2.25 in. broad; midrib slender, impressed above, sharply prominent beneath; main nerves 5 to 7 pairs, starting at an angle of 70° with the midrib and curving upwards to meet in a faint looped intramarginal nerve, impressed above, raised beneath, fairly conspicuous when dry; secondary nerves few or none; reticulations obliquely transverse; petiole .5 to .75 in. long, bordered by the decurrent margins of the blade, which are connivent. *Cymes* axillary, erect, as long as the petiole; peduncle .5 in. long, somewhat flattened, stout; branches 3 at first, again subdividing, crowded; pedicels quadrangular, .1 to .2 in. long; bracts ovate, acute, sheathing the bases of the joints and pedicels; buds clavate, the tip oblong; flowers yellow. *Calyx* .1 in. long, thick at base; lobes 4, ciliate, the two outer ovate-acute, the 2 inner oblong rounded, all with many small glands at the base within and 1 to 2 fairly large ones. *Corolla*-tube cylindric, .3 to .4 in. long, glabrous except the puberulous lower third inside; lobes broad, blunt, ovate, .15 to .2 in. long. *Stamens* occupying the upper half of the tube; filaments short, broad; anthers linear-lanceolate, apiculate, .125 in. long. *Ovary* conical, 4-angled, glabrous, with an angled style and acute stigma; cells 2-ovuled. *Berry* ellipsoid, 1.5 in. long, 1 in. in diameter; pericarp leathery, smooth, shining. *Seeds* usually 2 only, on a thin

septum and with little pulp, .7 in. long, .4 in. broad; testa membranous; cotyledons very thick, wrinkled on the inner face; radicle small, included between the cotyledons.

PERAK: *Scortechini* 1475; *Wray* 28, 592, 1366, 4009; *King's Collector* 2663, 3080; *Curtis*. MALACCA: *Griffith*; *Maingay* (K.D.) 1050, 1051. SELANGOR; *Ridley* 1963. SINGAPORE: *Kurz*; *T. Anderson* 60; *Ridley* 2735, 9166.

*Ridley's* specimen from Upper Bukit Mandai, Singapore, has dark rough branchlets, smaller leaves with closer main-nerves and less crowded cymes, but does not seem otherwise to differ, at any rate not sufficiently to warrant its being made a variety.

*L. Griffithii* is an india-rubber producer, and the product is said to be good, very probably as good as that of the neighbouring *L. elasticus*, Becc. 'Nelle foreste di Borneo,' pp. 358, 562, fig. 59, and Hook. Ic. Pl. t. 2733.

#### 4. MELODINUS, Forst.

Erect or scandent shrubs. *Leaves* opposite, penninerved, the nerves thin, parallel; reticulations transverse. *Flowers* in terminal trichotomously paniculate cymes or in axillary and condensed cymes, 5- rarely 4-merous, white or pale pink, often sweet-scented. *Calyx* 5-partite, eglandular within. *Corolla* hypocrateriform; tube cylindric, dilated more or less opposite the stamens; the lobes overlapping to the left, entire or fimbriate at the tips; the mouth with thick cleft or lobed scales. *Stamens* 5 or 4, at or below the middle of the tube; anthers included, oblong-lanceolate, cells rounded at the base; filaments short. *Disk* none. *Ovary* 2-celled; style short; stigma thick, bifid; ovules many in each cell, axile. *Fruit* a globose berry; pericarp coriaceous or hard. *Seeds* many, embedded in pulp; albumen fleshy; cotyledons thin, ovate, foliaceous; radicle long.—DISTRIB. India, Malaya, Southern China and Australasia, about 20 species.

Flowers rather large, in terminal paniced cymes; corolla-lobes oblong, rounded, entire (Subgenus I. EUMELODINUS) ..

1. *M. monogynus*.

Flowers small, in short axillary cymes; corolla-lobes dentate at tip, often fimbriate (Subgenus II. PLEUROPHACELUS):—

*Leaves* chartaceous, both surfaces brown and nearly similar in colour, the lower only slightly paler than the upper:—

*Cymes* scarcely longer than the petiole, .25 to .5 in. long:—

*Corolla-tube* thick, not much dilated, lobes bifid, one branch bicuspidate; buds .25 in. long; leaves with 20 to 30 pair main nerves .. .. .

2. *M. orientalis*.

*Corolla-tube* slender, dilated in middle, lobes bifid, one branch fimbriate-dentate; buds .15 to .2 in. long:—

*Leaves* rather broad, reaching 2.25 in., main nerves 10 to 15 pairs; cymes many-flowered .. .. .

3. *M. micranthus*.

- Leaves narrow, reaching only 1·25 in. broad, main nerves 18 to 22 pairs; cymes few-flowered .. 4. *M. citrifomis*  
 Cymes longer than the petiole, ·75 to 1 in. long; leaves greenish-brown when dry .. .. 5. *M. perakensis*.  
 Leaves coriaceous, upper surface olivaceous-brown, shining; lower surface paler and dull; cymes scarcely longer than the petioles; corolla-lobes scarcely bifid, much oblique, fimbriate at tip .. .. 6. *M. coriaceus*.

1. *MELODINUS MONOGYNUS*, Roxb. Fl. Ind. II. 56 (1832). A large glabrous climbing shrub; young branches thinner than a goose-quill, smooth, nearly cylindric, dull brown when dry. *Leaves* chartaceous; oblong or oblong-lanceolate, acuminate at apex, cuneate or rounded at base; glabrous on both surfaces, the upper shining, the lower rather dull and paler brown when dry; margins slightly recurved, somewhat crispate when dry; 4·5 to 6 in. long; 1·5 to 2 in. broad; midrib slender, impressed above, raised beneath; main nerves about 20 pairs, slender, at about an angle of 70° with the midrib, very slightly curved to meet an intramarginal looped nerve close to the edge; secondary nerves many, similar to main nerves but thinner, often forked, sometimes with recurrent branches; reticulations transverse, irregular; all faint on both surfaces; petiole ·2 to ·3 in. long, rather stout. *Cymes* terminal, puberulous, reaching 3 in. in length (occasionally more) and 2 to 3 in. in diam.; peduncles 0 to ·75 in. long; branches trichotomous; pedicels variable; bracts of the inflorescence and primary branches leafy, caducous, those at the bases of the branches and pedicels ovate, acute bracteoles 1 to 2, small, obtuse, on the pedicel itself; buds elongate, tip oblong, acute; flowers white, fragrant. *Calyx* campanulate; lobes 5, oblong-orbicular, sometimes emarginate, ciliate, ·15 to ·2 in. long, the margins hyaline. *Corolla*-tube cylindric, ·5 to ·75 in. long, widening upwards, glabrous or slightly puberulous without, densely villous within, above the stamens; lobes oblong-falcate, rounded, ·3 to ·5 in. long, more or less auricled, each with a 2- to 3-lobed glabrous scale near the base; throat with a corona of 5 bifid villous linear-falcate lobes. *Anthers* oblong-lanceolate, ·06 in. long; filaments slender, short. *Ovary* rounded; style slender, ·1 in. long; stigma thick, cylindric, with a sharp bifid apiculus, very gummy, embraced by the anthers. *Berry* globose, smooth, pulpy, reaching 3 in. in diam.; pericarp coriaceous, orange-coloured, smooth. *Seeds* numerous, flattened; integuments 2, outer thick rugose, inner membranous; albumen copious; cotyledons oval. A. DC. Prod. VIII. 329; Wall. Cat. 1603; Wight Ic. t. 394; Bot. Reg. t. 834; Bot. Mag. t. 2527; Hook. f. Fl. Br. Ind. III. 629; Prain Beng. Plants 668. *Echaltium piscidium*, Wight Ic. t. 472, *excl. fig. of fruit*. *Nerium piscidium*, Roxb. Fl. Ind. II. 7, *excl. descr. of fruit*.

PENANG: *Maingay* (K.D.) 1085. PERAK: *Curtis* 1308.—DISTRIB. India (Sikkim Himalaya, Cooch Behar, Assam, Khasia Hills and Sylhet); Timor (*Forbes* 3708). The fruit is edible.

2. *MELODINUS ORIENTALIS*, Blume Bijd. 1026 (1826) and Mus. Bot. Lugd.-Bat. I. 155, fig. LII. A large glabrous climbing shrub; branches smooth, rather slender, with nearly black bark; upper branchlets obscurely angled, glabrous. *Leaves* chartaceous; oblong or elliptic-oblong, obtusely acuminate at apex, acute at base and often unequal; glabrous on both surfaces, upper nearly black and shining when dry, lower chocolate-brown and dull; margins slightly undulate-crispate; 3 to 5·5 in. long, 1 to 2·25 in. broad; midrib slender, slightly impressed above, sharply raised beneath; main nerves about 20 to 30 pairs, at from 60° to 70° with the midrib, curving upwards and branching to meet an obscure intramarginal looped nerve quite close to the margin; secondary nerves hardly distinguishable from main nerves, but rather more slender, sometimes with recurrent branches; reticulations irregular, obscure; petiole ·3 to ·5 in. long, bordered by the decurrent margins of the blade, which are connivent. *Cymes* axillary, few-(8- to 10-) flowered, crowded, scarcely as long as the petioles; peduncles very short or almost none, stout; bracts ovate-acute, sheathing the branches and the very short (·025 in. long) pedicels, which also bear a pair of rounded bracteoles below the calyx; buds clavate, ·25 in. long, tip globose; flowers white. *Calyx* campanulate, thick, ·1 in. long; lobes half that length, ovate, rounded, puberulous. *Corolla*-tube thick, cylindric, ·2 in. long, dilated opposite the stamens, contracted above and below, puberulous without, and within below the stamens; lobes short, obliquely ovate, bifid, one branch bicuspidate, plicate in bud; throat with 5 thick fleshy 2-lobed scales. *Stamens* inserted in the middle of the tube; anthers lanceolate, apiculate, rounded at base; filaments short, slender. *Ovary* conoidal, ribbed, surmounted by a slender style ·05 in. long and obconic above; stigma conical with a bifid apiculus. *Berry* "large, yellow" (*Maingay*), "globose, red" (*Blume*), apparently about 2·5 in. in diameter. *Seeds* oblong, about ·8 in. long and ·4 in. broad, testa rugose. *Miq. Fl. Ind. Bat. II.* 395, t. xxxiv.; *A. DC. Prod. VIII.* 330; *Kurz in Journ. As. Soc. Beng. XLVI.* ii. 250, *in note*; *Hook. f. Fl. Br. Ind. III.* 629. *Hunteria?* *cuspidata*, *Wall. Cat.* 1609; *A. DC. l. c.* 350. *Alyxia?* *cuspidata*, *Wall. Herb. Chilocarpus cuspidatus*, *Benth. in Gen. Pl. II.* 698 (under *Hunteria*).

PENANG: *Wallich* 1609; *Phillips*; *Maingay* (K.D.) 1043/2 (*Chilocarpus suaveolens*); *Curtis* 738, 2838. PERAK: on Maxwell's hill, 3000 ft. *Scortechini* 355; at Goping, *King's Collector* 4530. DISTRIB. Java, Sumatra (*Forbes* 1568).

3. *MELODINUS MICRANTHUS*, Hook. f. in Fl. Br. Ind. III. 629 (1882). A climbing shrub (apparently); branchlets rather slender, terete, with nearly black bark, uppermost somewhat angular. *Leaves* chartaceous; oblong-lanceolate, obtusely acuminate at apex, attenuate at base; smooth and shining and dark reddish-brown on both surfaces when dry, the lower rather paler than the upper; margins recurved, slightly undulate; 3 to 6 inches long, 1 to 2.25 in. broad; midrib slender and impressed above, more conspicuous and raised beneath; main nerves 10 to 15 pairs, slender, remote, at an angle of from  $50^{\circ}$  to  $60^{\circ}$  with the midrib, and curving slightly upward to an obscure intramarginal nerve just within the edge, impressed above; secondary nerves few; reticulations transverse, oblique; petiole .15 to .25 in. long, slender. *Cymes* many-flowered, axillary, trichotomous, about .5 in. long; peduncles .2 in. long, rachis angular; bracts very small, ovate-acute, with ciliate hyaline tips; pedicels .05 to .075 in. long, with two bracteoles near the base of the calyx; buds clavate, tip conical-globose, .15 in. long. *Calyx* .075 in. long; tube about one-third of length; lobes ovate, rounded. *Corolla*-tube cylindric, dilated a little above the middle, constricted above and below, .125 in. long, pubescent within in a ring below the stamens; lobes short, unequally obtusely 2-lobed, twisted to the right; the base furnished with fleshy bifid scales closing the mouth. *Anthers* lanceolate, long-apiculate, .05 in. long; filaments very short. *Ovary* globose; style slender; stigma conical, with a short bifid apiculus. *Fruit* not seen.

PENANG: road to Sungie Penang, *Curtis* 1053. MALACCA: *Maingay* (K.D.) 1090.

4. *MELODINUS CITRIFORMIS*, King & Gamble, n. sp. A slender glabrous climbing shrub; young branches rather thicker than a crow-quill, dull brown when dry, with elongate lenticels. *Leaves* chartaceous; oblong-lanceolate, obtusely and often obliquely caudate-acuminate at apex, cuneate at base; both surfaces glabrous, dull olivaceous-brown when dry; margin slightly crisate; 3 to 4 in. long, 1 to 1.25 in. broad; midrib slender; main nerves 18 to 22 pairs, at rather irregular angles but usually at about  $70^{\circ}$  with the midrib, fairly straight, meeting an intramarginal nerve at less than .05 in. from the margin, faint on both surfaces when dry; secondary nerves many, irregular, alternate with the main nerves, recurrent and forked to form the inconspicuous reticulations; petiole .25 in. long. *Cymes* axillary, few-flowered, scarcely longer than the petiole; peduncle and pedicels very short, with many ovate obtuse bracteoles, which, however, scarcely imbricate; buds clavate, .2 in. long, tip globose; flowers light yellow. *Calyx* .05 in. long, campanulate; lobes very short, obtuse, hyaline on the margins. *Corolla*-

tube cylindric, dilated in the middle rather below the stamens, contracted above and below, glabrous except a ring of hairs within under the stamens, .125 in. long, with 5 lobed fleshy scales closing the throat; lobes angled, falcate, fimbriate at the tip, the tip inflexed when open. *Anthers* lanceolate, apiculate, .05 in. long; filaments short, pubescent at base. *Ovary* conoidal, tapering to a short style and oblong conical stigma, with a pale band at its base. *Berry* ovoid, orange, 3 to 3.5 in. long, 2.5 in. in diameter; pericarp smooth, shining, rather thin. *Seeds* numerous, embedded in pulp, roughly oblong, .6 in. long, .4 in. broad, with no apparent aril; testa thick, granular, brown, deeply pitted; albumen waxy or fleshy; cotyledons oblong, .125 in. long, flat; radicle thick, cylindrical, .275 in. long.

PERAK: in dense jungle at 500 to 800 feet, near Larút, *King's Collector* 6525.

5. *MELODINUS PERAKENSIS*, King & Gamble, n. sp. A glabrous climbing shrub; young branches thicker than a crow-quill, cinereous-brown, uppermost obscurely quadrangular. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and obtusely acuminate at apex, attenuate at base; both surfaces pale greenish-brown when dry, the upper somewhat shining and darker than the lower; margins slightly recurved; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, slightly impressed above, raised beneath; main nerves slender, 10 to 15 pairs, starting at about 60° with the midrib and curved upwards to and along the margin where they meet, forming a slightly broken wavy obscure intramarginal nerve; secondary nerves few; reticulations irregular, very faint, only the main nerves easily visible; petiole .15 to .2 in., stout. *Cymes* axillary, .75 to 1 in. long, lax, sessile; branches and .1 to .2 in. long pedicels slender; bracts ovate-acute, in pairs at the branches and below the pedicels with 1 to 2 obtuse bracteoles on the pedicel; buds clavate, .2 in. long, tips globose; flowers waxy-white. *Calyx* .05 in. long, campanulate; lobes broadly ovate, ciliate. *Corolla*-tube cylindric, slightly inflated in the middle opposite the stamens, narrowed at the throat; lobes oblong-spathulate, spreading, the apex lobed, one lobe fimbriately toothed; a large rounded gland at the base of each lobe, in the throat of the tube. *Anthers* lanceolate, cordate at base; filaments short, slender. *Ovary* broadly ovate; style slender; stigma conical with a bifid apiculus. *Fruit* pyriform, about 2 in. long by 1.5 in. broad; pericarp thin but woody, smooth. *Seeds* many, roughly triangular, .75 in. long; testa dark brown, rugose, crustaceous, deeply pitted.

PERAK: in open jungle on limestone hills, at 300 to 800 feet, *King's Collector* 4481, 7031.

6. *MELODINUS CORIACEUS*, Oliver in Hook. Ic. Pl. t. 1758 (1888).



A large climbing shrub; branchlets as thick as a swan's-quill, dark reddish-brown, rough, uppermost internodes flattened or angled and with vertical lines; nodes raised and with a slight ridge. *Leaves* coriaceous; elliptic or obovate or oblong-oblancheolate, obtuse or very slightly acute at apex, cuneate at base; upper surface olivaceous-brown, shining, lower much paler and dull, grey when dry; margins recurved; 3 to 5 in. long, 1·5 to 2 in. broad; midrib prominent, impressed above, raised beneath; main nerves 13 to 17 pairs, at about 60° to 70° with the midrib, nearly straight to join an obscure intramarginal nerve; secondary nerves recurrent, branching into reticulations, all fairly distinct on the upper, indistinct on the lower surface; petiole ·3 to ·5 in. long, channelled above. *Cymes* axillary, sessile, as long as or slightly longer than the petioles, many-flowered; rachis angular; bracteoles ovate, acute, ciliate; pedicels stout, ·05 in. long, much enlarged in fruit; buds clavate, with globose tip, ·25 in. long. *Calyx* ·05 to ·075 in. long; lobes half the length, ovate, acute, ciliate. *Corolla*-tube cylindric, constricted at the mouth and near the base, dilated between, opposite the stamens, pubescent within in a ring below the stamens, glabrous without, mouth furnished with 5 2-lobulate fleshy appendages which nearly close it; lobes ovate, falcate, very oblique, the tips fimbriate-dentate turned to the right. *Anthers* near the top of the tube, sagittate, apiculate, ·06 in. long; filaments short. *Ovary* globose, style slender; stigma conical, with a short bifid apiculus, very gummy. *Berry* ovoid or globose, 1·5 to 2·5 in. in diam.; pericarp yellowish, shining, tubercular. *Seeds* many, of irregular shapes, usually ovate pyriform; testa granular, rugose, much pitted; albumen waxy, deeply pitted by the ridges of the testa; cotyledons small, oblong, ·125 in. long; radicle cylindrical, ·25 in. long. *Alyxia* ? *coriacea*, Wall. Cat. 9065, and in Roxb. Fl. Ind. ed. Carey & Wall. II. 540; Hook. f. Fl. Br. Ind. III. 635. *Hunteria* ? *coriacea*, Wall. Cat. 1610.

PENANG: Wallich 1610, 9065; at Chalet, 1000 feet, Curtis 1040. PERAK: open jungle near Larút, King's Collector 7499; Waterfall Hill, Wray 2074.

## Tribe II.—PLUMERIEÆ.

### Subtribe 1.—RAUWOLFIINÆ.

#### 5. ALYXIA, Br.

Shrubs, sometimes scandent, usually glabrous. *Leaves* coriaceous, in verticils of 3 to 4, rarely opposite; the nerves more or less faint. *Flowers* rather small, in small axillary or terminal cymes. *Calyx* short, 4- to 5-partite, eglandular within. *Corolla* hypocrateriform; tube cylindric, slightly expanded opposite the stamens, throat naked;

lobes 5, slightly twisted, overlapping to the left. *Stamens* inserted above the middle of the tube; anthers lanceolate, their bases rounded. *Disk* none or obscurely annular. *Ovary* of 2 distinct carpels; style filiform; stigma oblong, urceolate or capitate, pointed or somewhat bifid; ovules 2 to 6 in two series in each carpel. *Fruit* of 1 or 2 drupes often pedicellate; drupes 1-seeded or with 2 to 4 one-seeded joints. *Seeds* ovoid or oblong, grooved or concave on the ventral surface at the attachment to the placenta; albumen horny, deeply ruminate, presenting horizontal parallel lamellæ; cotyledons thin, leafy, ovate or oblong, straight or curved; radicle long, thick.—**DISTRIB.** Tropical Asia, Australia, and Polynesia; about 30 to 35 species.

Drupes .5 in. long or under:—

Corolla pubescent without; leaves pubescent beneath .. 1. *A. pilosa*.

Corolla glabrous without; leaves usually glabrous beneath:—

Leaves coriaceous:—

Leaves mostly over 2 in. long:—

Main nerves 16 to 20 pairs at an angle of 60° to 70°

with midrib .. .. 2. *A. lucida*.

Main nerves 25 to 40 pairs at an angle of 80° with

midrib .. .. 3. *A. odorata*.

Leaves mostly under 2 in. long:—

Main nerves 10 to 12 pairs at right angles to midrib .. 4. *A. oleifolia*.

Main nerves 15 to 20 pairs at 75° to 80° with midrib .. 5. *A. pumila*.

Leaves chartaceous, 2.5 to 5 in. long, main nerves 27 to 30

pairs .. .. 6. *A. Forbesii*.

Drupes over .5 in. long:—

Leaves thinly coriaceous, 4 to 6 in. long, main nerves extremely numerous; drupes 1 in. long .. 7. *A. Scortechinii*.

Leaves coriaceous, 3 to 4 in. long, main nerves 25 to 30 pairs;

flower not known; drupe .75 in. long .. 8. *A. selangorica*.

1. *ALYXIA PILOSA*, Miq. Fl. Ind. Bat. II. 408 (1856). A slender climbing shrub; branches stout with pale bark; branchlets thinner than a goose-quill, angled, striate, dull brown, covered, especially the extremities, with dense minute grey tomentum. *Leaves* very coriaceous, opposite or more often in whorls of 3 to 4; lanceolate or elliptic-lanceolate, shortly acuminate at apex, cuneate or acuminate narrowed at base; upper surface shining olivaceous, lower pale yellowish-olivaceous densely short-pubescent; margins cartilaginous, recurved; 3 to 5 in. long, 1 to 1.5 in. broad; midrib very stout, very prominent on the under surface, impressed on the upper; main nerves 15 to 20 pairs, almost at right angles to the midrib, faintly depressed on the upper surface when dry, broad and pale on the lower; secondary nerves many, very indistinct, as are the reticulations; petiole .25 to .35 in. long, thick, bordered by the decurrent margins of the blade. *Cymes* axillary,

densely grey-pilose, reaching .75 to 1 in. in length; peduncles stout, .25 in. long; flowers subumbellately crowded; bracts at the bases of the umbels lanceolate, .15 in. long; bracteoles smaller, three on each pedicel, which is scarcely .1 in. long; buds clavate, the tip ovate-acute; flowers yellowish-white (?). *Calyx* deeply cleft, .15 in. long; lobes ovate-lanceolate, densely pubescent. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the mouth which bears inside an annular ring, .4 in. long, pubescent without and below the stamens within; lobes ovate-cordate, glabrous within, .15 in. long. *Anthers* elliptic lanceolate, apiculate, .06 in. long; filaments slender. *Ovary* (or the thin lobed disk surrounding and attached to it) densely villous; carpels 2; style slender, .25 in. long; stigma cylindric, with a bifid very short apiculus. *Fruit* of 1 or 2 pedicellate oblong-ellipsoid drupes, .5 in. long, .35 in. broad, tipped with the persistent base of the style; pericarp smooth, thin, wrinkled when dry. *Seed* 1, oblong, conform to the pericarp, furrowed on one side where it is attached to the placenta; testa membranous; albumen horny, deeply ruminant in closely packed horizontal lamellæ; cotyledons small, oblong; radicle long, cylindric. Hook. f. Fl. Br. Ind. III. 635.

PERAK: in dense jungle near the top of Gunong Malacca, at 3,500 to 4,000 feet, *King's Collector* 7170. MALACCA: on Mount Ophir, *Lobb*.—DISTRIB. Sumatra, Borneo (*Teysmann*, *Beccari* 1685, 2121).

*Lobb's* specimen has the leaves somewhat obovate, obtuse and almost emarginate at apex, but otherwise seems to be the same as the Peninsular and Sumatran specimens.

2. *ALYXIA LUCIDA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 540 (1824). A glabrous twining shrub; branches stout dark greyish-brown, sparsely lenticelled; branchlets quadrangular, grey to reddish-brown, shining. *Leaves* pergamaceous, opposite or in whorls of three, in young branches of four; elliptic or obovate, obtuse or bluntly acute at apex, cuneate at base; glabrous on both surfaces, the upper shining, olive-green when dry, the lower dull and pale; margins cartilaginous, recurved; 1.75 to 3.5 in. long, 1 to 1.25 in. broad; midrib slender, impressed above, raised beneath; main nerves 16 to 20 pairs, slender, at 60° to 70° with the midrib, straight to join an intramarginal nerve at .05 in. from the edge or nearer, indistinct on both surfaces, less so on the lower; secondary nerves many, between and similar to the main nerves, often branched; reticulations obscure; petiole .1 to .3 in. long, stout, bordered by the decurrent margins of the blade. *Cymes* axillary, trichotomous, corymbosely subumbellate, puberulous, reaching .75 in. long; peduncles angular, about .2 in. long; pedicels slender, .1 in. long; bracts linear-subulate, acute; bracteole on the pedicel, rounded; buds

clavate .3 in. long, the tip ovate; flowers yellowish-white, fragrant. *Calyx* deeply 5-cleft; lobes linear, acute, .06 in. long, pubescent, ciliate on the margins. *Corolla*-tube narrowly cylindric, slightly dilated near the top opposite the stamens, contracted at the throat which is naked but furnished with an annular fold within, glabrous without, puberulous below the stamens within; lobes oblong, broad, .125 in. long, recurved. *Stamens* inserted below the throat of the tube; anthers lanceolate, .05 in. long; filaments as long, slender. *Disk* of 5 minute very villous scales, surrounding the ovary and almost adherent. *Ovary* of 2 distinct carpels, ovoid, glabrous; style .15 to .2 in. long, very slender; stigma oblong, apiculus bifid. *Fruit* of 1 or 2 pedicellate drupes; the pedicels .3 to .5 in. long; drupes .5 in. long, .3 in. broad, ellipsoid, shortly apiculate; pericarp thin, striate. *Seed* solitary, .3 to .5 in. long, .2 to .3 in. broad, ellipsoid, deeply cleft on one side where it is attached to the placenta; testa membranous; albumen horny, deeply ruminate, and presenting closely packed horizontal lamellæ; cotyledons flat, oblong, .075 to .1 in. long; radicle cylindric, stout, .15 in. long. Hook. f. Fl. Br. Ind. III. 635. *A. Gynopogon*, Syst. Veg. IV. 440; Wall. Cat. 1605. *A. quinata*, Miq. Fl. Ind. Bat. II. 407, *vide* Stapf in Trans. Linn. Soc. Ser. 2, IV. 207.

KEDAH: at Gunong Raya, *Curtis* 2547. PENANG: *Curtis* 2881, 3088. PERAK: *Ridley* 7177; *Cantley*. DINDINGS: Pangkor, at Rajah Itam, *Curtis* 1622. MALACCA: cultivated, *Maingay* (K.D.) 1054. SINGAPORE: *Wallich* 1605; *Murton* 12; *Ridley* 1801, 4427, 8905.—DISTRIB. Sumatra, Borneo (*Haviland* 2176, flowers rather longer than type).

3. *ALYXIA ODORATA*, Wall. Cat. 1606 (1829). A climbing shrub, with smooth very dark brown bark; young branches thinner than a goose-quill, 4-angled, shining, dark red-brown when dry. *Leaves* coriaceous, opposite or in whorls of 3 to 4; oblanceolate or oblong-oblanceolate, obtuse or subacute at apex, narrowed at the base; both surfaces glabrous, pale brown when dry, the upper shining, the lower rather dull; margins recurved; 2 to 5 in. long, 1 to 1.5 in. broad; midrib stout, impressed above, raised and sharp beneath; main nerves extremely numerous, perhaps 25 to 40 in number, but difficult to distinguish from the equally numerous secondary nerves, which are branched and often recurrent, usually at an angle of 80° with the midrib and straight to join an intramarginal nerve close to the edge, raised but faint on the upper surface, almost invisible on the lower; petiole .2 to .3 in. long, bordered by the decurrent margin of the blade. *Cymes* axillary, about .5 in. long, including the short angled peduncle, few-flowered; pedicels .06 in. long, angular, pubescent; bracts lanceolate;

buds clavate, .3 to .4 in. long, tip ovate. *Calyx* campanulate, .1 in. long; lobes 5, linear-lanceolate, pubescent. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the throat which is annulate within, glabrous outside, pubescent within, .4 in. long; lobes ovate, broadly obtuse, recurved, .125 in. long. *Anthers* narrowly ovate; filaments short, slender. *Disk* none or so appressed to the ovary as to be indistinguishable, white-villous. *Ovary* of 2 rounded carpels; style very slender, .3 in. long; stigma capitate. *Fruit* of 2 or 1 ellipsoid, long- (up to .4 in.) pedicelled drupes, often 2-seeded by superposition; each drupe .4 to .5 in. long, .3 in. broad; pericarp ribbed, furrowed on one side opposite the placenta. *Seed* conform to the drupe; testa membranous, separated; albumen deeply ruminate in horizontal lamellæ.

MALACCA: *Griffith*. SINGAPORE: at Sungei Morai, *Ridley* 4427, 5659.—DISTRIB. Burma (Tenasserim, *Wallich* 1606).

*Ridley's* specimens show smaller leaves than those of the type, of which there is only one specimen, *viz.* in the Wallichian Herbarium at the Linnean Society, but the shape and nervation agree, as does the bark of the twigs. The Wallichian specimen and *Griffith's* being in fruit only, the description of the flowers is taken from *Ridley's*.

4. *ALYXIA OLEIFOLIA*, King & Gamble, n. sp. A small climbing or epiphytic shrub; branchlets rather thick, boldly angled, with smooth pale brown bark, minutely rugose and puberulous; nodes swollen and ridged. *Leaves* thickly coriaceous, opposite or in whorls of three; elliptic or elliptic-lanceolate sometimes almost rhomboid, acute at apex or slightly blunt-acuminate, narrowed at base; upper surface shining, dark olivaceous, lower surface dull yellowish-olivaceous, both surfaces glabrous, lower sometimes punctulate; margins much recurved when dry; 1.5 to 2.5 in. long, .75 to 1.25 in. broad; midrib very stout and broad, much impressed above and raised beneath; main nerves 10 to 12 pairs, at right angles to the midrib, often forked, depressed above, invisible beneath; secondary nerves many, very obscure; reticulations invisible; petiole stout, .15 to .25 in. long, wrinkled, bordered by the decurrent margins of the blade. *Cymes* subterminal and axillary, reaching about 1 in. in length, glabrous, few-flowered; peduncles .3 to .5 in. long, angular, as are the branches; pedicels short; bracteoles linear-subulate, similar to the calyx-lobes; buds clavate, .4 to .5 in. long, tip ovate. *Calyx* campanulate, deeply 5-lobed; lobes linear-subulate, .1 in. long, ciliate. *Corolla*-tube cylindric, slightly dilated opposite the stamens, contracted at the mouth which is annulate within, glabrous except slight pubescence below the stamens within; lobes ovate, obtuse, erect or slightly recurved, .15 in. long. *Anthers*

ovate-lanceolate, .05 in. long; filaments slender. *Disk* of 5 densely villous scales surrounding the ovary. *Ovary* of 2 rounded carpels, puberulous; style slender; stigma globose with a bifid apiculus; ovules 1 in each cell. *Fruit* of 1 or 2 very shortly pedicellate ellipsoid drupes, each drupe about .5 in. long and .35 in. broad; pericarp crustaceous, striate, slightly furrowed on one side opposite the placenta, transversely ridged within. *Seed* 1, grooved on one side where it is attached to the placenta, .4 in. long, .25 in. broad; testa membranous; albumen horny, deeply ruminant in horizontal lamellæ; cotyledons ovate, .1 in. long; radicle cylindric, thick, .15 in. long.

PERAK: in the mountains, at 4,500 to 5,500 feet, *Wray* 230, 3846, 4116; *Scortechini*; *King's Collector* 7405; *Cantley*, at Gunong Bubu, 5,040 feet.

5. *ALYXIA PUMILA*, Hook. f. Fl. Br. Ind. III. 635 (1882). A small climbing shrub; branchlets as thick as a crow-quill, angled, reddish-brown, minutely rugose, innovations with deciduous pubescence. *Leaves* coriaceous, opposite or in whorls of 3; narrowly elliptic or ovate- or lanceolate-elliptic, acute or shortly subacuminate at apex, cuneate at base or slightly rounded; both surfaces glabrous except when very young, upper shining dark olivaceous, lower dull and pale almost yellowish; margins recurved; .75 to 2 in. long, .35 to .75 in. broad; midrib rather slender, impressed above, raised beneath; main nerves 15 to 20 pairs, at from 75° to 80° with the midrib, very faint on the upper surface, invisible on the lower; secondary nerves few, faint, reticulations invisible; petiole .1 to .15 in. long, stout, bordered by the decurrent margins of the blade. *Cymes* short, axillary, 5- or 6-flowered, on .25 in. long peduncles. *Calyx* deeply 5-lobed; lobes linear, ciliate, .05 in. long. *Corolla*-tube cylindric below, dilated near the top opposite the stamens, then constricted above, .2 in. long, glabrous without, pubescent within below the stamens; lobes ovate, .05 in. long, glabrous, spreading; throat not annulate. *Anthers* lanceolate, acute, rounded at base, .04 in. long. *Disk* 5-lobed, white-villous. *Ovary* 2-carpelled; style slender; stigma oblong. *Fruit* of 2, usually 1, short-pedicelled ellipsoid drupes, each about .4 in. long, .3 in. broad; pericarp crustaceous, shining, grooved on one side. *Seed* conform to the drupe, grooved on one side at the attachment to the placenta; testa thin, separated; albumen horny, ruminant in flat lamellæ.

KEDAH: at Gunong Jerai, *Ridley* 5504. PERAK: top of Batu Kusan, *Scortechini* 1621. MALACCA: *Maingay* (K.D.) 1053; on Mount Ophir, *Ridley* 10094; *Lobb*.

6. *ALYXIA FORBESII*, King & Gamble, n. sp. A climbing shrub; branchlets as thick as a crow-quill, 3-angled, pale brown, shining,

glabrous; the nodes slightly swollen, ridged. *Leaves* chartaceous, opposite or in whorls of 3 to 4; lanceolate, oblong-lanceolate or elliptic-lanceolate, obtusely rather long-acuminate at apex, cuneate at base; both surfaces glabrous, green when dry, the lower slightly paler and dull; margins very slightly recurved, thinly cartilaginous; 2·5 to 5 in. long, .75 to 1·5 in. broad; midrib slender but prominent, impressed above, raised beneath; main nerves very numerous, 27 to 30 pairs, at an angle of about 80° with the midrib, slender, straight to join a slender intramarginal nerve less than .05 in. from the edge, difficult to distinguish from the very numerous, often branching, secondary nerves; reticulations irregular, all nerves rather faint on the upper, very obscure on the lower surface; petiole .05 to .1 in. long, bordered by the decurrent, usually connivent margins of the blade. *Cymes* axillary, slender, lax, glabrous, 3- to 5-flowered, reaching in all about 1 in. in length; peduncles .25 in. long; pedicels very slender, .1 to .15 in.; bracts 0 or linear, leafy, caducous; buds clavate, .5 in. long, tip ovate; flowers white. *Calyx* shortly campanulate, deeply 5-lobed; lobes ovate-acute, spreading, .1 in. long. *Corolla*-tube cylindric, .4 to .6 in. long, slightly dilated near the top opposite the stamens, contracted at the throat, which is annulate within, glabrous except the upper part within; lobes ovate-cordate, .15 to .2 in. long, recurved. *Anthers* lanceolate, rounded at base; filaments short, slender. *Disk* undulately 5-lobed, white-villous, enclosing the ovary. *Ovary* of 2 rounded glabrous carpels; style very slender; stigma globose, with a bifid apiculus. *Fruit* of 1 or 2 ellipsoid drupes on very short pedicels, each drupe .4 to .5 in. long and .3 in. broad, grooved on one side opposite the placenta; pericarp thin, almost membranous. *Seed* 1, conform to the drupe; testa membranous; albumen horny, deeply ruminant; cotyledons oblong, .15 in. long; radicle stout, .1 in. long, the base oblique. *A. stellata*, Wall. Cat. 1604; Hook. f. Fl. Br. Ind. III. 636 (*not of* Roem. and Sch.). *Gynopogon stellatum*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 251, and For. Fl. II. 176 (*not of* Labill.).

PENANG: Wallich 1604. PERAK: at Gunong Iras, 4,000 feet, Wray 4165; on Larut Peak, 3,000 to 4,000 feet, King's Collector 2124; *Scortechini*. PAHANG: at Kluang Terbang, W. D. Barnes 10898.—DISTRIB. Sumatra (*Forbes* 2268; on Mount Dempo, at 4,000 to 5,000 feet, 2256); Java (*Forbes* 1043).

On following up the suggestion made in the Fl. Br. Ind. that this plant is not identical with the Polynesian *A. stellata*, we feel bound to agree, and consider it best to give it a new name.

7. *ALYXIA SCORTECHINII*, King & Gamble, n. sp. A climbing shrub; young branches thinner than a goose-quill, pale brown, shining, angled,

minutely rusty-puberulous, nodes swollen. *Leaves* thinly coriaceous, in whorls of 3 or opposite; oblong-ob lanceolate, shortly cuspidate-acuminate at apex, narrowed at the base from above the middle; upper surface dark-olivaceous, glabrous, shining when dry, lower surface almost dull, paler and in young leaves minutely puberulous especially along the midrib; margins thin, slightly recurved; 4 to 6 in. long, 1.5 to 2 in. broad; midrib stout, impressed above, raised beneath; main nerves extremely numerous, probably more than 50, but difficult to distinguish from similar secondary nerves, usually at an angle of 80° with the midrib, straight to join an intramarginal nerve at a little less than .05 in. from the edge, much branched recurrently, raised on the upper surface; reticulations in a minute network; petiole .3 to .5 in. long, transversely corrugated when dry and bordered by the decurrent edges of the blade. *Cymes* sessile, axillary, densely crowded, about twice as long as the petioles; bracts numerous, linear-lanceolate, pubescent; pedicels very short, bracteolate below the calyx; buds clavate, .5 in. long, tip oblong obtuse. *Calyx* .15 in. long, campanulate, deeply cleft in 4 to 5 linear lobes, .1 in. long, pubescent outside, glabrous within. *Corolla*-tube cylindric, dilated near the top opposite the stamens, contracted at the mouth, which is annulately folded within, pubescent within and on the upper half without, .4 in. long; lobes 4 to 5, ovate, erect or recurved, pubescent, margins incurved, .15 in. long. *Anthers* ovate-lanceolate, apiculate, .05 in. long; filaments slender. *Disk* villous, appressed to the ovary. *Ovary* of 2 conical carpels; style very slender, .3 in. long; stigma minute, capitate. *Fruit* of 2, more usually 1, ellipsoid, long-pedicelled drupes, about 1 in. long and .5 in. broad; pericarp ribbed when dry, especially opposite the placenta. *Seed* conform to the drupe; albumen ruminant; cotyledons oblong; radicle cylindric, rather long.

PERAK: *Scortechini*; at lower camp, Gunong Batu Poteh, Wray 1091; at Kwal Kangsa, Ridley 2895.

Ridley's specimen is the only one with fruit and its leaves are rather thinner than those of the other specimens, but otherwise it corresponds well enough. To this species probably also belong Burbidge's specimens in leaf only from Borneo, and Beccari's No. 333 from Sumatra, all in the Kew Herbarium.

#### SPECIES IMPERFECTLY KNOWN.

8. *ALYXIA SELANGORICA*, King & Gamble, n. sp. A slender climbing shrub; branchlets the size of a crow-quill, pale brown, shining, angled. *Leaves* coriaceous, opposite or in whorls of 3 to 4; obovate or oblanceolate, shortly and abruptly acuminate at apex, long cuneate at base;



olivaceous and shining on the upper surface, dull and rather paler and minutely rusty-puberulous on the lower; margins recurved; 3 to 4 in. long, 1 to 1.25 in. broad; midrib stout, impressed above, raised beneath; main nerves very many, 25 to 30 or more, difficult to distinguish from the similar but rather fainter secondary nerves, these latter recurrent-branched, all meeting an obscure intramarginal nerve, nearly at right angles to the midrib, obscure on both surfaces but slightly raised on the upper; petiole .25 in. long, rusty-pubescent, bordered by the decurrent margins of the blade. *Flowers* not known, but fruiting cymes axillary, scarcely longer than the petiole, few-flowered. *Fruit* of 1 or 2 long-pedicelled drupes; pedicels .3 to .4 in. long; drupes oblong ellipsoid, acute at both ends, .75 in. long, .35 to .45 in. broad; pericarp black and wrinkled when dry. *Seed* conform to the drupe but rounded at the ends, grooved on one side where it is attached to the placenta; testa thin, separated; albumen horny, much ruminant in horizontal lamellæ; cotyledons oblong, .2 in. long, .075 in. broad; radicle stout, cylindric, .225 in. long.

SELANGOR: at Gua Batu, *Ridley* 8558.—DISTRIB. Sumatra (*Forbes* 3212).

## 6. RAUWOLFIA, Linn.

Trees or shrubs, glabrous or rarely pubescent. *Leaves* 3- to 4-nately whorled or opposite (rarely); nerves slender. *Flowers* in corymbose or umbellate cymes, usually compound, alternate with the terminal leaves or axillary to the upper leaves. *Calyx* short, 5-lobed, eglandular. *Corolla*-tube cylindric, sometimes dilated opposite the stamens, constricted at the mouth, the throat usually hairy within; lobes 5, broad, overlapping to the left. *Stamens* included in the corolla-tube above the middle; filaments short; anthers small, acute, rounded at base. *Disk* cup-shaped or annular. *Carpels* 2, distinct or connate; style filiform; stigma broad, calyptriform or peltate; ovules 2, collaterally placed, in each carpel. *Fruit* of 2 connate or distinct drupes, each with a crustaceous 1-seeded pyrene. *Seeds* ovate; testa thin; albumen thin, fleshy; cotyledons flat; radicle large, superior.—DISTRIB. About 50 species, chiefly tropical American; about 10 from India and the Malay Peninsula and islands.

Corolla-tube cylindric, inflated opposite the stamens; carpels distinct; pyrenes flattened; leaf-nerves rather distant (Subgenus I. OPHIOXYLON)	..	..	..	..	1. <i>R. perakensis</i> .
Corolla-tube campanulate, not inflated opposite the stamens; carpels connate; pyrenes rounded and beaked; leaf-nerves many, close (Subgenus II. CYRTOSIPHONIA)	..	..	..	..	2. <i>R. sumatrana</i> .

1. *RAUWOLFIA PERAKENSIS*, King & Gamble, n. sp. A small shrub; branchlets somewhat fleshy, pale brown, as thick as a goose-quill, sparsely lenticellate. *Leaves* fleshy in texture when green, membranous when dry; opposite or whorled, variable in size, glabrous; lanceolate or spatulate, rather long acuminate at apex, narrowly attenuate at base; bright green above turning dark brown when dry, greyish-green beneath turning buff; 4 to 8 in. long, 1 to 3 in. broad; midrib broad, often sinuous when dry; main nerves 12 to 15 pairs, pale, starting from the midrib nearly at right angles and curved upwards to and along the margin; secondary nerves and reticulations obscure; petiole slender, .5 to .75 in. long. *Cymes* corymbose, long-peduncled, 1 to 4 together from the axils of upper leaves; peduncle 1.5 to 3.5 long; branches dichotomous, ultimate ones subumbellate; pedicels slender, .1 in. long, .25 in. fruit; bracts minute, triangular, caducous. *Calyx*-lobes ovate-acuminate, .06 in. long, glabrous. *Corolla*-tube slender, .3 to .5 in. long, tubular, inflated towards the top, glabrous on both sides; lobes ovate, blunt, about .1 in. long. *Disk* annular, .04 in. long. *Stamens* short, blunt; anthers as long as the filaments. *Ovary* rounded; style filiform .15 to .2 in. long; stigma cylindric-calyptiform. *Drupe*s crimson, connate only at the base, obliquely ovate, .5 in. long, .25 in. broad, flattened; exocarp fleshy. *Pyrenes* crustaceous, prominently rugose; albumen thin; cotyledons ovate; radicle as long as cotyledons, together .25 to .3 in. long.

PERAK: *Scortechini* 920, 1161, 8410; *Wray* 3692; *Ridley* 2898, 5523. PAHANG: *Ridley* 1166.

This species is very near *R. densiflora*, Benth., of Ceylon, S. India, and the Khasia Hills, but differs in the much shorter calyx-lobes, the narrower corolla-tube, and the flattened drupes. From *R. serpentina*, Benth., it differs in the veins of the leaves starting nearly at right angles instead of obliquely, and in the larger, usually more separated and flatter drupes and more pitted pyrenes

2. *RAUWOLFIA SUMATRANA* Jack Mal. Misc. 22 (1820). A small tree reaching 40 to 50 feet in height, and 6 to 10 in. in diameter, with erect stout branches and milky juice; branchlets more or less quadrangular, lenticellate. *Leaves* pergamaceous, opposite or verticillate, generally in threes, sometimes in fours, elliptic-oblong to obovate-spatulate, shortly acute or acuminate at apex, long-attenuate at base; margins entire, slightly reflexed; both surfaces glabrous, the lower pale; 6 to 8 in. long, 2 to 3 in. broad; midrib slender, very prominent, impressed above, much raised beneath; main nerves parallel, 32 to 35 pairs, nearly at right angles (80°) to the midrib, then straight, joining in a looped intra-marginal nerve near the edge; secondary nerves similar but fainter, usually one only between each pair of main nerves; reticulations very

few; petiole .75 to 1 in. long, slightly winged by the decurrent margins of the blade. *Flowers* in terminal compound umbels; primary peduncles 3 to 5, stout, 3 to 4 in. long; secondary peduncles 6 to 8, 1 to 1.5 in. long; tertiary peduncles 3 to 5, about .5 in. long; quaternary peduncles and pedicels slender, .1 to .25 in. long, umbellules of about 4 to 6 flowers; bracts subulate, recurved; bracteoles very minute; buds subglobose, flowers white. *Calyx*-lobes imbricate, nearly orbicular, .05 in. long on a tube of same length. *Corolla*-tube campanulate, .2 in. long; lobes rounded, recurved, .05 to .1 in. long; tube tufted-pubescent within at the mouth and a little below it; lobes short, rounded, .075 in. long. *Anthers* sagittate mucronate, .04 in. long; filaments very short. *Disk* thick, short, barely .025 in. long, obscurely 5-lobed. *Ovary* 2-celled, furrowed; style slender, .1 in. long; stigma peltate; cells 2-ovuled. *Drupe* oblong-globose, smooth, .6 to .7 in. long, .5 to .6 in. broad; pyrenes two, compressed at top, enlarged below, beaked, longitudinally furrowed and rugose, woody. *Seed* flattened; testa membranous; albumen thin; embryo flattened; cotyledons ovate, .1 in. long; radicle thick, as long as cotyledons. Hook. Bot. Misc. II. 73; Blume Bijdr. 1034; A. DC. Prodr. VIII. 337; Hassk. Fl. Bot. Zeit. (1845) 263; Spanoghe in Linnæa, XV. 325; Koord. & Val. Bijdr. I. 93. *Cyrtosiphonia sumatrana*, Miq. Fl. Ind. Bat. II. 401.

PERAK: *Scortechini* 132, 1737; *King's Collector* 4755, 5700.—

DISTRIB. Sumatra (*Teysmann* 993, 995; *Forbes* 2851, 2860), Java (*Forbes* 1051).

Jack says that the wood is very light, and is used by the Sumatrans for the scabbards of swords and krises.

## 7. HUNTERIA, Roxb.

Glabrous trees. *Leaves* opposite, coriaceous, shining, with many slender nerves. *Flowers* in short close axillary or subterminal cymes. *Calyx* small, 5-lobed, eglandular. *Corolla* salver-shaped; the tube cylindric, somewhat dilated near the mouth, throat annulate; lobes much overlapping to the left. *Stamens* inserted in the dilated portion of the tube; anthers oblong-lanceolate, cells rounded at the base; filaments short. *Disk* none. *Carpels* 2, distinct; style filiform, thickened at top; stigma bifid; ovules 2 to 4 in each carpel. *Fruit* of two stalked berries, distinct or connate at base, ovoid or subfusiform, oblique or recurved, 1-seeded or 2-celled by the intruded placenta, not pulpy. *Seeds* ovoid or oblong; testa membranous; albumen smooth, fleshy; cotyledons ovate, leafy; radicle straight.—DISTRIB. Three species—one of India, Ceylon, and Malay Peninsula, another of Java, and a third of tropical Africa.

HUNTERIA CORYMBOSA, Roxb. Fl. Ind. I. 695, and ed. Carey and Wall. II. 531 (1824). A tree, reaching 30 to 40 feet in height and 15 to 20 in. in diameter; branchlets slender, slightly angled and striate, and dull brown when dry. *Leaves* oblong or oblong-lanceolate, obtusely abruptly caudate-acuminate at apex, acute at base; glabrous on both surfaces; 3 to 7 in. long, 1 to 2 in. broad; midrib slender, impressed above, prominent beneath; main nerves numerous, about 22 to 26 pairs, slender, slightly curved upwards to meet in an intramarginal nerve close to the edge; secondary nerves similar to main-nerves, recurrent-branched; reticulations prominent, all more or less raised on both surfaces when dry; petiole .25 to .5 in. long, slender. *Cymes* on short peduncles about .5 to .75 in. long; branches corymbose, short; pedicels slender, angled, .1 to .2 in. long; bracts minute; flower-buds slender, .5 to .6 in. long; flowers waxy-white. *Calyx*-lobes ovate-acute, .05 to .1 in. long, glabrous. *Corolla*-tube cylindrical, .3 to .35 in. long, slightly dilated above and annulate at the throat, minutely pubescent within; lobes ovate-oblong, .2 to .25 in. long. *Stamens* with short filaments; anthers .05 in. long. *Carpels* conical, glabrous. *Berries* globose, obtusely beaked, smooth, yellow, 2-seeded, .75 in. in diameter, on a .25 in. long flattened stalk. *Seeds* ovoid, flattened on one side, convex on the other, .5 in. long, .4 in. broad; testa very thin; albumen thick, fleshy; cotyledons ovate, .125 in. long, 3-nerved; radicle stout, cylindric, as long as the cotyledons. Wall. Cat. 1608; Wight Ic. t. 428; A. DC. Prodr. VIII. 350; Miq. Fl. Ind. Bat. II. 409; Hook. f. Fl. Br. Ind. III. 637; Trimen Fl. Ceyl. III. 128. *H. zeylanica*, Gardn.; Thw. Enum. 191; Bedd. Fl. Sylv. t. 265. *H. ? lanceolata*, Wall. Cat. 161; A. DC. l.c. *H. Roxburghiana*, Wight Ic. t. 1294; Thw. Enum. 192; Bedd. l.c. CLVIII. *Cameraria zeylanica*, Retz. Obs. IV. 24; A. DC. l.c. 389. *Gynopogon lanceolatum*, Kurz For. Fl. II. 177. *Tabernaemontana salicifolia*, Wall. Cat. 1580. *T. parviflora*, Herb. Heyne.

KEDAH; on Lankawi Island, Curtis 237. PENANG: Wallich 1608; King's Collector 1460, 1468; Phillips. PERAK: Wray 3378; King's Collector 7465. SELANGOR: Ridley 8556.—DISTRIB. India, Ceylon, Burma, Sumatra (*Forbes* 2716, 2722, 2737).

#### Subtribe 2.—CERBERINÆ.

##### 8. CERBERA, Linn.

Small glabrous trees or large shrubs. *Leaves* alternate or scattered, long, with slender parallel nerves. *Flowers* large, white or red, in pseudo-terminal cymes. *Calyx* 5-lobed, eglandular, the segments long; tube almost none. *Corolla* large; tube funnel-shaped above,

cylindric below; lobes 5, spreading, overlapping to the left. *Stamens* included, small; anthers lanceolate, apiculate, rounded at base. *Disk* none. *Carpels* 2, distinct; style filiform; stigma large, disciform, with a bilobed apiculus; ovules 4 in each carpel, on both sides of a thick placenta. *Fruit* of 1, rarely 2, globose or ellipsoid drupes; pericarp very thick, fibrous and woody. *Seeds* broad, compressed, peltately attached to the enlarged placenta; albumen none; cotyledons thin; radicle very short.—*DISTRIB.* Species 4, found in Madagascar, tropical Asia and the Pacific Islands.

CERBERA ODOLLAM, Gaertn. Fruct. II. 193, t. 124 (1791). A small tree or large shrub, with very thick branches and stout branchlets prominently marked by the scars of fallen leaves. *Leaves* leathery; variable in shape and somewhat in venation; oblanceolate or oblong-obovate, acute or abruptly short acuminate at apex, attenuate at base; black when dry, glabrous on both surfaces, shining above; 3 to 8 in. long, 1 to 2 in. broad; midrib slender; main nerves numerous but variable in number (15 to 25), starting nearly at right angles to the midrib, straight and meeting in an intramarginal looped nerve; secondary nerves many, between the main nerves, reticulations indistinct; petiole .75 to 1.5 in. long, stout. *Cymes* large; main peduncles stout, 3 to 5 in. long; branches corymbosely paniculate; bracts ovate, deciduous, leafy, .5 to 1 in. long; pedicels .75 to 1 in. long, stout; flowers white with a red or yellow throat. *Calyx* glabrous, lobes linear-oblong, acuminate, .5 to 1 in. long. *Corolla*-tube .5 to .75 in. long, cylindric below, funnel-shaped above, pubescent and ribbed within and furnished with 5 projecting ribs at the mouth; lobes broadly elliptic, oblique, acute, about as long as the tube. *Drupe* ovoid, 2 to 4 in. long, smooth, green; 2 to 4 in. in diameter; pericarp very thick, fleshy without, fibrous within. *Seeds* broad, compressed; cotyledons fleshy, ovoid, flattened. A. DC. Prodr. VIII. 353; Wight Ic. t. 441; Roxb. Fl. Ind. I. 692, and ed. Carey & Wall. II. 527; Miq. Fl. Ind. Bat. II. 413; Brandis For. Fl. 322; Kurz For. Fl. II. 171; Bedd. Fl. Sylv. CLVII.; Hook. f. Fl. Br. Ind. III. 628; Trimen Fl. Ceyl. III. 128; Cooke Fl. Bomb. II. 128; Prain Beng. Plants 670; Koord. & Val. Bijdr. I. 84. *C. Manghas*, Linn. Sp. Pl. 208, partly; Wall. Cat. 1582 and Roxb. Fl. Ind. ed. Carey & Wall. II. 529; Hook. Bot. Mag. t. 1845; K. Schum. in Engl. & Prantl Nat. Pflanzenfam. IV. 2, 159, fig. 57, P to S. *C. lactaria*, Ham.; A. DC. l. c.; Miq. l. c. 414. *C. laurifolia*, Lodd. Bot. Cab. t. 989. *Tanghinia Odollam, lactaria*, and *laurifolia*, G. Don Gen. Syst. IV. 98. "Odollam," Rheede Hort. Mal. I. t. 39.

PENANG: Wallich 1582; Curtis 1651, 1713. PERAK: Scortechini 964; Wray 2508; Ridley 7178; King's Collector 1131. MALACCA: Griffith; Hervey. SINGAPORE: Ridley 8083; Hullett 807, 871. —

DISTRIB. India, Ceylon, Burma, Malay Archipelago, China, Australia, Pacific Islands.

A plant of sea-coasts and tidal creeks. Hullett says the Malay name is "*Betak-betak*," and that the milky juice is poisonous. Linnæus's name, *C. Manghas*, ought to take precedence of Gaertner's, but it was applied to two species, the former of which belonged to a different genus, so we follow the Fl. Br. Ind. and other authorities in retaining Gaertner's name.

#### 9. OCHROSIA, Juss.

Trees. *Leaves* whorled, rarely opposite or scattered; nerves very numerous, parallel, spreading. *Cymes* pedunculate at the ends of the branches, alternate with the uppermost leaves, finally lateral. *Calyx* 5-lobed, eglandular. *Corolla* salver-shaped; tube cylindric, not or very slightly dilated opposite the stamens, throat naked; lobes 5, twisted, overlapping to the right. *Stamens* included in the tube of the corolla, at or above the middle; anthers lanceolate, rounded at the base. *Disk* very small, annulate, or none. *Carpels* 2, distinct or connate at the base; style filiform; stigma oblong, 2-fid; ovules in each carpel 2 to 6, biseriate, on either side of a prominent placenta. *Fruit* of 2 spreading drupes, sometimes connate at the base; epicarp thinly fleshy; endocarp thick, hard, often dorsally compressed and more or less grooved ventrally. *Seeds* solitary or 2 separated by the placenta, flattened; testa membranous; albumen absent or fleshy; cotyledons large, flat, foliaceous; radicle short, superior.—DISTRIB. About 12 species, found from the Mascarene Islands eastwards through the Malay Archipelago to Australia and the Pacific.

OCHROSIA BORBONICA, Gmel. Syst. Veg. I. 439 (1796). A small evergreen glabrous tree, reaching 20 feet in height; branches very stout, fleshy; branchlets fleshy, glaucous green, marked with the prominent scars of fallen leaves. *Leaves* fleshy when green, membranous when dry, in whorls of 3 to 4 or irregularly placed; obovate, obtuse and very briefly apiculate at apex, cuneately narrowed at base; upper surface shining, lower pale; 4 to 10 in. long, 2 to 5 in. broad; midrib stout, raised on both sides; main nerves many, 20 to 26 pairs, slender, parallel, leaving the midrib at an angle of about 80° and slightly curving to meet in an intramarginal nerve close to the edge; secondary nerves 1 to 2 between each pair of main nerves branching and joining the irregular reticulations; petiole .5 to 1.5 in. long, thick. *Cymes* in short, thick, corymbose branches; primary peduncles stout, 1 to 4 in. long; secondary peduncles about 1 in. long; branches and pedicels short, thick; lower bracts somewhat leafy, upper deciduous; bracteoles 2, triangular, on the pedicels below the calyx; flowers white; buds elongate. *Calyx*-lobes

coriaceous, ovate; tube about equal to lobes, *Corolla*-tube cylindric, about .15 in. long, glabrous within; lobes spreading, oblong, as long as tube or rather longer. *Drupe*s 2 to 2.5 in. long, 1.75 in. broad, slightly recurved, yellow, obliquely ovoid. *Seeds* large, flat. A. DC. Prodr. VIII. 356; Wall. Cat. 1584; Bedd. Fl. Sylv. CLVIII. ; Hook. f. Fl. Br. Ind. III. 638; Trimen Fl. Ceyl. III. 129, t. 60. *O. salubris*, Blume Mus. Bot. I. 158; Kurz For. Fl. II. 172. *Cerbera salutaris*, Lour. Fl. Cochinch. I. 163; Blume Bijdr. 1033. *C. parviflora* Wall. Cat. 1584. *C. oppositifolia* Lam. Enc. I. 62; A. DC. l.c. 354. *C. platysperma*, Gaertn. Fruct. II. 193. *Lactaria salubris*, Rumph. Herb. Amb. II. 255, t. 84; Miq. Fl. Ind. Bat. II. 415. *Calpicarpum Lamarckii*, G. Don Gen. Syst. IV. 100.

SINGAPORE: Wallich 1584.—DISTRIB. Andaman Islands, Ceylon, Mascarene Islands, Malay Archipelago.

A plant of the tidal creeks, "more decidedly maritime than *Cerbera Odollam*" (Trimen). The milky juice is thick and viscid. The leaves as shown in Trimen's plate are not at all characteristic.

#### 10. KOPSIA, Blume.

Glabrous trees or shrubs. *Leaves* opposite, membranous or subcoriaceous, penniveined. *Flowers* white or pink, in short terminal cymes; the rachis often bearing imbricated bracts. *Calyx* small, 5-partite, eglandular within. *Corolla* salver-shaped; tube very slender, only slightly dilated opposite the stamens, without scales at the mouth, pilose within; lobes twisted, overlapping to the right. *Stamens* near the top of the tube; anthers acute, cells rounded at the base. *Disk* of 2 glands alternating with the carpels. *Carpels* 2, distinct; style filiform; stigma thickened, with a short apiculus; ovules 2 in each carpel, 1 on either side of a thick placenta. *Fruit* of 2 obovoid or obliquely quadrate drupes or capsules, furrowed on the anterior face; pericarp subcoriaceous, 1-seeded, or 2-celled by the intruded placenta and two-seeded. *Seeds* oblong; testa membranous; albumen none; cotyledons usually thick.—DISTRIB. About 12 species of the Malay Peninsula and Archipelago.

Tube of corolla dilated at the top:—

Branches of the inflorescence with rather distant bracts:—

Leaves usually more than 5 in. long and 2 in. broad:—

Cymes much-branched, many-flowered; lobes of corolla

broad .. .. 1. *K. fruticosa* var. *albiflora*.

Cymes little-branched, few-flowered; lobes of corolla

narrow .. .. 2. *K. pauciflora*.

Leaves usually under 5 in. long and 2 in. broad:—

- Carpels glabrous; corolla-tube under 1 in. long; calyx-lobes acuminate .. .. 3. *K. Scortechinii*.  
 Carpels hairy; corolla-tube over 1 in. long; calyx-lobes rounded .. .. 4. *K. Griffithii*.  
 Branches of the inflorescence covered with many closely imbricating bracts; bracts very small; cyme-branches very short; corolla-tube under .4 in. long .. .. 5. *K. larutensis*.  
 Tube of corolla dilated in the middle; branches of the inflorescence with imbricating bracts:—  
 Cymes under .5 in. long; leaves lanceolate, under 4.5 in. long .. .. 6. *K. Ridleyana*.  
 Cymes 1 to 3 in. long; leaves elliptic-oblong or oblong-obovate, 5 to 9 in. long .. .. 7. *K. macrophylla*.

1. *KOPSIA FRUTICOSA*, A. DC. Prodr. VIII. 352 (1844). A large evergreen shrub; branchlets smooth, pale brown. *Leaves* thinly coriaceous, opposite; elliptic, elliptic-oblong; or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate attenuate at base; glabrous on both surfaces, shining above, pale beneath; 4 to 9 in. long, 1.5 to 3.5 in. broad; midrib thick; main nerves prominent beneath, 10 to 14 pairs, more or less parallel, gradually curving upwards to meet in a faintly looped intramarginal nerve close to the edge; secondary nerves short; reticulation distinct; petiole short, .25 in. long, ending in a gland at the apex. *Cymes* short, in a dense many-bracted subtrichotomous corymb at the ends of pseudo-terminal peduncles; peduncle short, stout; secondary peduncles also short, as are the tertiary and the pedicels; all minutely fulvous-pubescent, as are the bracts; bracts many, ovate, acute or obtuse, .1 to .15 in. long, pubescent, ciliate on the edges, leaving when they fall prominent scars; bracteoles similar, 2 on each pedicel under the calyx. *Calyx*-tube short; lobes 5, minutely pubescent, ovate-oblong, obtuse or emarginate and with a gland at the apex, ciliate on the margins, .15 to .2 in. long. *Corolla*-tube slender, slightly dilated at the summit opposite the stamens, 1.5 in. long; mouth red, minutely pubescent; lobes elliptic obovate, obtuse, half as long as the tube or slightly more, pink. *Anthers* oblong-lanceolate, acute. *Disk*-glands beaked. *Carpels* 2, oblong, obtuse; style slender; stigma calyptriform, 2-lobed at top. *Fruit* of 2 (more usually 1) urn-shaped flattened capsules, more or less triangular in shape, 1 to 1.25 in. long, villous, veined, opening by a slit on the ventral margin. *Seeds* oblong-lanceolate, .8 in. long, .25 in. broad, 3-ribbed; testa membranous; albumen none; cotyledons oblong-lanceolate, .75 in. long, .25 in. broad, fleshy; radicle very small. Bot. Mag. 4220; Hook. f. Fl. Br. Ind. III. 639; Prain Beng. Plants, 671. *Calpicarpum Roxburghii*, G. Don Gen. Syst. IV. 100; Wight Ic. t. 431; Kurz For. Fl. II. 178; Miq. Fl. Ind. Bat. II. 412. *Cerbera fruticosa*,



Ker Bot. Reg. t. 391; Roxb. Fl. Ind. I. 691, and ed. Carey & Wall. II. 526; Wall. Cat. 1583.

SINGAPORE: cultivated, *Maingay* (K.D.) 1055.—DISTRIB. Burma. This shrub is very commonly cultivated in Indian and Malayan gardens.

VAR. *albiflora*, King & Gamble. Differs but little from the species, but has white flowers, a glabrous acutely pointed capsule, more oblong leaves, and rather larger corolla-lobes. *Calpicarpum albiflorum*, Teysm. & Binn. in Tijds. Ned. Ind. XXV. (1863) 402. See also Ridley in Trans. Linn. Soc. Ser. 2, III. 320.

SINGAPORE: *Goodenough* 59; *King's Collector* 1232; *Ridley*.—DISTRIB. Java, Ceram (*Teysmann* 5035).

2. *KOPSIA PAUCIFLORA*, Hook. f. Fl. Br. Ind. III. 639 (1882). A shrub (?); branchlets slender, pale brown, uppermost angled. *Leaves* chartaceous; elliptic or elliptic-lanceolate, obtusely caudate-acuminate at apex, acuminate at base; olivaceous-green and somewhat shining on the upper, yellowish and dull on the lower, surface; 4 to 6 in. long, 1.5 to 2.5 in. broad; midrib fairly prominent, impressed on the upper, much raised on the lower, surface; main nerves 6 to 10 pairs, distant, starting at an angle of 60° with the midrib and curving upwards to join in an obscure intramarginal nerve quite close to the edge; secondary nerves and transverse reticulations prominent on the lower surface; petiole .25 in. long, stout. *Cymes* terminal, few-flowered; the rachis .25 to .5 in. long, with many ovate-acute persistent bracts. *Calyx* .15 in. long; lobes ovate, obtuse, rather shorter than the tube. *Corolla*-tube very slender, cylindric, 1.5 to 2 in. long, villous inside, dilated at the top; lobes linear-oblong, 1 in. long, at length reflexed in flower. *Anthers* small, near the top of the tube. *Fruit* not known.

MALACCA: on Mount Ophir, *Maingay* (K.D.) 1056.

3. *KOPSIA SCORTECHINII*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; the branchlets swollen at the nodes. *Leaves* chartaceous; elliptic oblong, briefly acuminate at apex, unequally narrowed at base; somewhat shining on the upper, pale on the lower surface; margins slightly recurved; 2 to 5 in. long, 1 to 2 in. broad; midrib slender, impressed above, ending in a gland at the apex; main nerves 8 to 16 pairs, at an angle of about 70° with the midrib, curving upwards to join in an intramarginal nerve immediately close to the edge; reticulations inconspicuous; petiole .1 in. long, glandular at the base inside. *Cymes* terminal, pseudo-terminal or lateral, on peduncles of varying (.25 to 2 in.) length; branches spreading, corymbose; bracts ovate-triangular, acute, .1 to .15 in. long, glabrous; pedicels short variable, each with a pair of small bracteoles; flowers large, white; buds clavate. *Calyx*-tube scarcely any; lobes ovate

acuminate, with a gland at the point behind, ciliate on the margins, .1 in. long. *Corolla*-tube slender, dilated at the top then constricted, .75 to 1 in. long, pubescent within below the stamens and half-way down; lobes spreading, linear-oblong, .5 to .75 in. long. *Anthers* lanceolate-acuminate, .1 in. long; filaments short. *Disk*-scales longer than carpels, broadened below, beaked above. *Carpels* glabrous; style very slender; stigma short, cylindric. *Fruit* not seen.

PERAK: *Scortechini* 1878.

4. *KOPSIA GRIFFITHII*, King & Gamble, n. sp. A small tree (?); branchlets pale brown, slender, enlarged at the nodes. *Leaves* coriaceous; ovate to ovate-oblong, abruptly obtusely caudate-acuminate at the apex, which is often emarginate, attenuate at the base; shining above, pale beneath; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, prominent and channelled above; main nerves many (22 to 30 pairs), close, parallel, starting at an angle of about 70° with the midrib, and slightly curving to meet in an intramarginal nerve close to the edge, raised and prominent on the upper, less so in the lower surface; reticulations few; petiole .25 in. long, bordered by the decurrent margins of the blade, those of each pair of leaves embracing the branchlet so as nearly to meet. *Cymes* axillary and pseudo-terminal, sessile or on very short peduncles, corymbose; primary branches few and irregular in length and number of flowers (sometimes 1 flower only); bracts ovate-acute, very small, glabrous; pedicels slender, .4 to .6 in. long, with 2 to 3 minute bracteoles near the middle; flowers apparently large, white; buds long, clavate. *Calyx*-tube almost none; lobes nearly orbicular, .05 in. long, ciliate on the margins, a gland on the back near the top. *Corolla*-tube very slender, 1 to 1.5 in. long, inflated at the top, slightly pubescent within below the stamens; lobes ovate, ovate-oblong or oblong, obtuse, .75 to 1 in. long. *Anthers* lanceolate-acuminate, .15 in. long; filaments short. *Disk*-glands subulate, slender. *Carpels* obtuse, densely long-hairy; style slender; stigma oblong, bifid. *Fruit* not seen.

MALACCA: *Griffith*.

VAR. *paucinervia*, King & Gamble. A shrub, 4 to 6 feet high, flower very white. Similar to the species, but the leaves with fewer, 12 to 15 main nerves leaving the midrib at an angle of about 50° only, and not so abruptly or caudately acuminate. The carpels show the same shaggy hairs, and the disk-glands are the same.

PERAK: *King's Collector* 10707, in dense jungle, on limestone hills, at 500 to 800 feet.

5. *KOPSIA LARUTENSIS*, King & Gamble, n. sp. A shrub reaching 10 feet in height, or a small tree up to 25 feet; branches pale brown,

rather smaller than a goose-quill, corky-barked and somewhat scurfy when dry. *Leaves* coriaceous; oblong-lanceolate, obtusely long caudate-acuminate at apex, cuneate at base; margins recurved; upper surface shining, lower pale, both reddish when dry; 4 to 10 in. long, 1.5 to 2.5 in. broad; midrib stout, ending in a gland at the extreme apex; main nerves parallel, 15 to 22 pairs, impressed on the upper, raised on the lower surface, starting at an angle of about  $70^\circ$  to the midrib and gently curving upwards to meet in a looped intramarginal nerve close to the edge; secondary nerves and reticulations few; petiole very short or almost none, at most .2 in. long, stout, those of each pair of leaves joined by a slight ridge at the nodes. *Cymes* axillary or pseudo-terminal, sessile, few- (up to 10-) branched, very short at first but lengthening gradually to .5 in.; the branches covered with very small ovate-triangular densely imbricate bracts; flowers small, cream-coloured; buds clavate. *Calyx*-tube short; lobes ovate, obtuse, with a gland on the back near the top, ciliate on the margins. *Corolla*-tube cylindrical, slender, .3 to .4 in. long, slightly dilated at the top opposite the stamens, pubescent within; lobes spreading, much twisted, .3 in. long, oblong-spathulate. *Anthers* lanceolate, apiculate, the bases rounded; filaments very short. *Disk*-glands subulate. *Carpels* 2, glabrous. *Fruit* of 2 (often only 1) urn-shaped capsules, triangular in shape, inflated on the dorsal, grooved on the ventral margin where they dehisce, .7 in. long on the ventral margin, .6 in. broad, .25 in. thick, striate, beak sharp. *Seeds* 1, ovoid, .4 in. long; testa membranous; albumen none; cotyledons fleshy, thick; radicle very small.

PERAK: in low-lying woods near Larut, Wray 2736, 3956; *Scortechini* 57, 59, 1704; *King's Collector* 462, 2082, 4269, 6165.

6. *KOPSIA RIDLEYANA*, King & Gamble, n. sp. A low shrub, reaching a foot or so in height; branchlets smooth, the size of a crow-quill. *Leaves* chartaceous when dry; lanceolate, obtusely acuminate at apex, cuneately attenuate at base; shining above, pale below; 4 to 4.5 in. long, 1 to 1.5 in. broad; midrib slender, ending in a gland at the apex; main nerves 12 to 14 pairs at an angle of about  $60^\circ$  with the midrib, curving upwards to meet in a slender looped intramarginal nerve, raised above as are the few secondary nerves and oblique reticulations; petiole .15 in. long, somewhat stem-clasping and slightly fimbriate-scaly at the base. *Cyme* terminal or apparently so, sessile, branches very few (2 to 3), about .3 to .5 in. long, furnished with many ovate-acute broadly sheathing glabrous bracts; flowers on very short pedicels, pure white; buds clavate. *Calyx*-tube very short; lobes ovate, obtuse or almost emarginate, with a gland on the back, glabrous, .1 to .15 in. long.

*Corolla* very slender, 1 in. long, dilated in the middle, pubescent at the mouth, glabrous within; lobes spreading, oblong-obovate, .75 in. long, .25 in. broad. *Anthers* lanceolate, acute, rounded at base, .1 in. long; filaments very short. *Disk-glands* subulate. *Carpels* 2, 2-celled, each cell 2-seeded; style very slender; stigma cylindrical, bilobed. *Fruit* not known.

NEGRI SEMBILAN: at Perhastian Tinggi, *Ridley* 10093.

7. *KOPSIA MACROPHYLLA*, Hook. f. Fl. Br. Ind. III. 639 (1882). A shrub, 6 to 10 feet high; branchlets dark brown, the size of a goose-quill, smooth. *Leaves* thinly coriaceous when fresh, chartaceous when dry; elliptic-oblong or oblong-obovate, obtusely short caudate-acuminate at apex, cuneate at base; margins only slightly or not recurved; upper surface light green with yellow towards the centre when fresh and with a metallic lustre when dry, lower surface pale brown, very minutely pubescent especially on the nerves; 5 to 9 in. long, 2 to 2.5 in. broad; midrib stout, ending in a gland at the apex; main nerves 18 to 22 pairs, raised on both surfaces, sometimes branched, at first straight and parallel, starting at an angle of about 55° with the midrib, then slightly curving to join in an intramarginal nerve close to the edge; secondary nerves few and reticulations prominent above when dry; petiole none or at most .1 in. long, those of each pair of leaves joined by a slight ridge at the node. *Cymes* pseudo-terminal, with a short (.5 to .7 in.) stout peduncle and few, usually 2, thick branches, 1 to 3 in. long, densely covered with small broadly ovate pubescent imbricate ciliate bracts, .1 to .15 in. long; the branches not again branched; pedicels very short, stout; bracteoles 2, obtuse, ciliate, pubescent, under the calyx; flowers very white; buds clavate. *Calyx*-tube very short; lobes 5, imbricate, oblong, obtuse or emarginate, with a gland on the back, minutely pubescent and ciliate, .1 in. long. *Corolla*-tube very slender, 1 in. long, dilated in the middle, glabrous within except for a slight ring below the anthers; lobes obovate, .5 to .75 in. long, .4 to .5 in. broad, rounded. *Anthers* lanceolate, .1 in. long; filaments very short, slightly pilose at base. *Carpels* rounded, minutely pubescent at apex; style slender. *Fruit* not seen, said to be pale green in colour.

PERAK: in rich soil on low ground, *King's Collector* 4963. SINGAPORE: *Lobb*.

Haviland's No. 3042 from Borneo comes very near this, but the tube of the corolla is dilated near the top; the bracteate branches of the inflorescence are longer; and the leaves have a dark upper surface, more irregular main-nerves and the marginal nerve farther from the edge, and with another more slender outside it. But the material is insufficient for description.

Subtribe 3.—EUPLUMERINÆ.

11. ALSTONIA, Br.

Trees or erect shrubs; branches often in whorls. *Leaves* usually whorled, rarely opposite, frequently with numerous nearly horizontal nerves; stipules sometimes represented by glands or a ridge between the leaf-petioles. *Inflorescences* of terminal or pseudo-terminal corymbose or umbelliform cymes, sometimes verticillate on the rachises. *Calyx*-tube short, sometimes urceolate, sometimes almost none; lobes 5, short, eglandular. *Corolla* hypocrateriform; tube cylindric, dilated opposite the stamens, usually at the top, the throat naked, annulate or with reflexed hairs; lobes overlapping either to the right or left. *Stamens* usually at the top of the tube, sometimes lower, included; anthers free, usually lanceolate; filaments short, filiform. *Disk* none, or annular or lobed; the lobes 2 alternate with the carpels. *Carpels* 2, distinct; style filiform; stigma oblong or cylindric, usually bifid at apex; ovules in each cell many, pluriseriate. *Fruit* of 2 follicular mericarps, usually long, cylindric, slender. *Seeds* oblong, compressed, peltate on flattened tough placentas, ciliate and usually with tufts of long hairs at the ends; testa membranous, often papillose; albumen fleshy, rather scanty; cotyledons oblong, flat; radicle about as long as the cotyledons, superior.—DISTRIB. Species about 30; found in India, Malaya, tropical Australia and Polynesia, one in tropical Africa.

Leaves with close parallel nerves, apex usually obtuse; corolla-lobes overlapping to the left; follicles over 6 in. long, equally broad throughout; seeds rounded at both ends (Subgenus I. PALA):—

Ovary villous; corolla-tube pubescent without; leaves 3 to 7 in. long .. .. . 1. *A. scholaris*.

Ovary glabrous; corolla-tube glabrous without:—

Corolla-tube rather broad; follicles glabrous; leaves 2 to 4 in. long .. .. . 2. *A. spathulata*.

Corolla-tube slender; follicles pubescent; leaves 2·5 to 5 in. long .. .. . 3. *A. angustiloba*.

Leaves with close parallel nerves, apex usually acute; corolla-lobes overlapping to the left; follicles under 6 in. long, broadest in the middle; seeds oblong, dentate at the ends (Subgenus II. BLABEROPUS) .. .. . 4. *A. Curtisii*.

Leaves with distant more or less parallel nerves; corolla-lobes overlapping to the right; follicles long, slender, equally broad throughout; seeds acute or acuminate at one end, rounded at the other (Subgenus III. DISSURASPERMUM):—

Stamens inserted at the top of the corolla-tube, which is

glabrous without; leaves 5 to 12 in. long; main nerves 20 to 24 pairs; seeds rounded at one end, bifid and acute at the other .. .. .

5. *A. macrophylla*.

Stamens inserted near the middle of the corolla-tube, which is pubescent without; leaves usually 4 to 6 in. long; main nerves 12 to 16 pairs; seeds rounded at one end, long-acuminate at the other .. .. .

6. *A. angustifolia*.

#### IMPERFECTLY KNOWN.

7. *A. GRANDIFOLIA*.

8. *A. PANGKORENSIS*.

1. *ALSTONIA SCHOLARIS*, Br. in Mem. Wern. Soc. Edinb. I. 76 (1811). A large evergreen tree, reaching 60 feet or more in height and 6 feet or more in girth; stem buttressed; branches verticillate; branchlets smooth, swollen at the nodes; juice milky, bitter as is also the wood; glabrous except the inflorescence. *Leaves* coriaceous, verticillate, 4 to 7 in a whorl; oblong-obovate, oblong or elliptic-oblong, obtuse or sometimes shortly and bluntly acute, occasionally emarginate at apex, cuneate at base; bright green and shining above, white or grey glaucous beneath, 3 to 7 in. long, 1·5 to 2·5 in. broad; midrib thick; main nerves parallel, 30 to 40 pairs, at first almost at right angles to the midrib, slightly curving upwards to an intramarginal nerve close to the edge; secondary nerves many, similar but more slender; reticulations few; petiole stout, ·25 to ·75 in. long, with a hooked process on the upper side near the base. *Inflorescence* pseudo-terminal. *Cymes* umbellately branched; main peduncles stout, 3 to 5, variable in length, usually 2 to 3 in.; secondary peduncles slender, 5 to 7, supported often by a spatulate leafy bract; pedicels short; terminal flowers subcapitate; bracteoles oblong or ovate; flowers greenish-white; buds obovoid; whole inflorescence more or less tawny pubescent. *Calyx*-tube very short; lobes ovate, obtuse, ciliate, sometimes unequal in size. *Corolla*-tube cylindric, slightly enlarged below, much dilated at the top, hairy on both sides, ·25 to ·35 in. long, annulate within at the mouth; lobes ovate, obtuse, ·15 in. long, cordate at base, rounded at top. *Disk* none. *Anthers* lanceolate, acute, rounded below; pollen-grains spherical, with small prominences. *Ovary* densely pale-villous; style slender; stigma cylindric, bifid at apex. *Fruit* of 2 follicles, 1 to 2 feet long and ·10 to ·15 in. broad, pendulous, terete. *Seeds* oblong, peltate, on a narrow placenta, flattened, ·3 in. long, ·075 in. broad, scabrous-papillose on both surfaces, reddish-brown, furnished at each end with tufts of slender tawny hairs up to ·5 in. long; albumen very thin; cotyledons oblong, about ·1 in. long; radicle slender, as long as cotyledons. A. DC. Prodr. VIII. 408; Wall. Cat. 1644; Wight Ic. t. 422; Hook. f. Fl.

Br. Ind. III. 642; Miq. Fl. Ind. Bat. II. 436; Blume Bijdr. 1037; Brandis For. Fl. 325; Bedd. Fl. Sylv. t. 242; Kurz For. Fl. II. 183; Koord. & Val. Bijdr. I. 117; Trimen Fl. Ceyl. III. 133; Engl. & Prantl IV. i. 138, t. 53; Cooke Fl. Bomb. II. 132; Prain Beng. Plants, 672. *Echites scholaris*, Linn. Mant. 55. *E. Pala*, Ham. ex Spreng. Syst. I. 633; A. DC. l. c. 477. — “Pala,” Rheede Hort. Mal. I. t. 45.

PENANG: Wallich 1644A. PERAK: Wray 170 (Vern. “Poko Palai”); Scortechini 601; King's Collector 7952. MALACCA: Hervey. SINGAPORE: Wallich 1644B. — DISTRIB. Throughout India, Ceylon and Burma, the Malay Archipelago, tropical Australia and Africa.

2. *ALSTONIA SPATHULATA*, Blume Bijdr. 1037 (1834). A tree reaching 30 to 40 feet in height and 12 to 15 in. diam, (*Scortechini* and others), 60 to 100 feet in height and 3 to 4 feet in diameter (*King's Collector* 5263); glabrous; branches verticillate; branchlets smooth, swollen at the nodes. *Leaves* coriaceous; verticillate, 3 to 5 in a whorl; obovate or spathulate; rounded at the apex, or sometimes slightly obcordate; cuneate at base; bright green and shining above, whitish beneath, when dry both surfaces brown; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib stout, impressed above; main nerves raised above, 20 to 30 pairs, the lower ones horizontal, the upper gradually more and more curving upwards to meet in an intramarginal nerve close to the edge; secondary nerves few, similar; reticulations indistinct; petiole very short, bordered by the decurrent margin of the blade. *Inflorescence* pseudo-terminal. *Cymes* small, umbellately arranged in whorls; peduncle 1 to 2 in. long, stout, usually 1 only, sometimes 2 to 3; whorls of flowers 2 to 3, about .5 in. or less apart; pedicels slender, .25 to .5 in. long; bracts and bracteoles small, ovate-acute, caducous; flowers a “frosty” or “waxy” white; buds clavate. *Calyx*-tube .05 in. long; lobes as long, orbicular, margins ciliate. *Corolla*-tube slender below, dilated above, .25 in. long, pubescent within, annulate at the throat; lobes oblong, twisted, .2 in. long, white villous within at the base. *Anthers* lanceolate, small; filaments very short; pollen-grains spherical with opposite round prominences. *Disk* none or very short. *Ovary* glabrous; carpels separate below, joined above; style slender, .15 in. long; stigma cylindric, bifid. *Fruit* of two follicles, 5 to 7, occasionally to 9, in. long, .1 to .15 in. broad, erect, terete, sometimes minutely pubescent. *Seeds* oblong, peltate, flattened, .25 in. long, .1 in. broad, ciliate and margined all round, nearly smooth on the faces, furnished at each end with tufts of slender tawny hairs up to .75 in. long; albumen scanty; cotyledons oblong, about .1 in. long; radicle as long as cotyledons, slender. A. DC. Prodr.

VIII. 410; Miq. Fl. Ind. Bat. II. 437; Hook. f. Fl. Br. Ind. III. 642; Koord. & Val. Bijdr. I. 121. *A. cuneata*, Wall. Cat. 1645

PERAK: in low marshy places and on river banks, *Scortechini* 1716; *Wray* 170 bis; *King's Collector* 400, 4009, 6852, 7464, 7780. MALACCA: *Griffith*; *Maingay* (K.D.) 1068; *Derry* 1064; *Cantley* 1937.—DISTRIB. Java, Borneo (*Haviland*, 1689, 3044).

Wallich's No. 1645 bears on the label, "e Sirmur," which is clearly a wrong habitat as mentioned by Hooker.

3. *ALSTONIA ANGUSTILOBA*, Miq. Fl. Ind. Bat. II. 438 (1856). A large tree reaching 60 to 100 feet in height and 3 to 4 feet in diameter; branches spreading, verticillate; branchlets dark brown, as thick as a goose-quill, terete. *Leaves* coriaceous, verticillate, 4 to 7 in a whorl, oblong or elliptic-oblong, shortly and obtusely acute at apex, attenuate at base; shining light green above, glaucous grey beneath; margins recurved; 2·5 to 5 in. long, 1 to 1·5 in. broad; midrib prominent; main nerves very many, 30 to 40, the lower ones parallel, at right angles to the midrib, the upper curved upwards, all meeting in the slightly thickened nerve-like margin, raised above; secondary nerves few, similar; reticulations very indistinct; petiole ·5 to ·75 in. long, channelled above, bordered by the decurrent margins of the blade. *Inflorescence* terminal, grey-pubescent, umbellate; peduncles stout, 1 to 5 together (usually 1 only), followed by a whorl of about 4 to 6 secondary branches, ·25 to ·5 in. long, bearing capitate clusters of many flowers on very short pedicels, and in addition 3 to 5 longer branches surmounted by similar capitate clusters or again whorled; bracts and bracteoles very small, ovate-acute, caducous; flowers dark red without, pale yellow within (K.C. No. 5270); buds narrow, linear, clavate, glabrous. *Calyx*-tube short; lobes ovate-acute, grey-pubescent, ciliate, together ·06 in. long. *Corolla*-tube cylindrical, slightly dilated above, annulate at the mouth, glabrous without, pubescent within, ·25 in. long; lobes narrow, linear-oblong, ·15 to ·2 in. long, with a small tuft of villous hairs at the base within. *Disk* none. *Anthers* lanceolate-acute; pollen-grains spherical, with 2 small spherical prominences opposite each other on different sides. *Ovary* glabrous; carpels distinct; style slender; stigma cylindrical, bifid at apex. *Fruit* of two grey-pubescent follicles, 6 to 8 in. long and barely ·1 in. in diameter, erect, terete. *Seeds* flat, rectangular-oblong, ·2 in. long, ·05 in. broad, bordered, not papillose, furnished at each end with a tuft of long tawny hairs up to ·5 in. long; albumen scanty; cotyledons oblong, narrow; radicle as long as cotyledons. Koord. & Val. Bijdr. I. 120.

PENANG: *Curtis* 3087. PERAK: *Wray* 4058; *King's Collector* 5263,



5270. MALACCA: *Griffith*. SINGAPORE: *Cantley* 166; *Ridley* 8095 (var. *glabra*, Koord. & Val.).—DISTRIB. Java (*Koorders* 1 $\beta$ , 14230), Borneo (*Haviland* 1732). Wray gives the vernacular name "*Jelutong*," Curtis "*Getah Paule*," Cantley "*Gutta Pulei*."

A leaf-specimen collected by G. King "halfway up Penang hill," in August, 1879, and another from Malacca, collected by Hervey in 1885, have "*Leaves* in whorls of 4 to 6, oblong-lanceolate, shortly and bluntly acuminate at apex, attenuate at base; green above, glaucous grey beneath; 4 to 6 in. long, 1 to 1.5 in. broad; main nerves very many, nearly 40, very regular and parallel; petiole rather slender, .25 to .6 in. long." They agree well with Teysmann's No. 994 from Loeboe Aloeng, Sumatra, *Alstonia calophylla*, Miq. Fl. Ind. Bat. II. 439.

4. *ALSTONIA CURTISII*, King & Gamble, n. sp. A dwarf compact shrub; branchlets slender, grey, ringed by the ridges marking fallen leaves. *Leaves* membranous when dry, in whorls of 3 to 4; oblanceolate, sharply acuminate at apex, attenuate at base; dull on both surfaces, pale beneath; margins recurved; 3 to 4 in. long, .75 to 1 in. broad; midrib slender; main nerves parallel, starting at about 70° to the midrib and curved upwards to the margin, 24 to 27 pairs, indistinct; secondary nerves similar, between the main nerves; reticulations very indistinct; petiole none or very short, bordered by the decurrent margins of the blade, with 2 to 3 small subulate glands on the upper surface at the base. *Cymes* pseudo-terminal, 1 to 2, few-flowered; peduncles short, .1 to .2 in. long; pedicels slender, .75 in. long; flowers white; buds long clavate with a swelling in the middle. *Calyx*-tube short; lobes as long as tube, .05 in., ovate-acuminate, hyaline at the margins, glabrous. *Corolla*-tube very slender, 1 in. long, dilated a little above the middle, glabrous without, slightly pubescent within below the stamens; lobes oblong-falcate, overlapping to the left in bud, .6 in. long, spreading, glabrous. *Stamens* inserted within the dilatation; anthers lanceolate, .15 in. long; filaments short; pollen globose. *Disk* of two subulate scales on broad bases alternate with the carpels. *Ovary* glabrous; style very slender; stigma cylindric, elongated (.05 in.), bifid at apex; ovules very many. *Fruit* of two glabrous follicles, 3 to 3.5 in. long, .1 to .15 in. broad, acuminate at apex. *Seeds* oblong, peltate on a tough placenta, .25 in. long, .1 in. broad; margins scabrous, dentate, especially at the ends; testa covered with brown papillæ on the outer and with two ridges on the inner side; coma white, silky, very short at the sides, up to .15 in. long at the ends; albumen scanty.

KASOOM: limestone islands, *Curtis* 3242.

5. *ALSTONIA MACROPHYLLA*, Wall. Cat. 1648 (1829). A large tree, reaching 40 to 60 feet in height and 1 to 2 feet in diameter; branches stout, fleshy; branchlets more or less quadrangular and channelled on

the sides, marked with prominent leaf-scars. *Leaves* chartaceous; ternately verticillate, oblong-lanceolate or elliptic-lanceolate; shortly and abruptly acuminate at apex, cuneately attenuate at base for nearly half their length; light green above, pale and glabrous or sparsely brown-pubescent, especially along the nerves beneath; margins slightly recurved; 5 to 12 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 20 to 24 pairs, parallel, starting at about 65° with the midrib and curving upward to meet in a very faint looped intramarginal nerve close to the edge, raised beneath; secondary nerves none; reticulations transverse, indistinct; petiole stout, .5 to 1 in. long, when young slender, base enlarged. *Inflorescence* pseudo-terminal, sessile; peduncles about 6 to 10, slender, 1 to 2 in. long, simple or occasionally branched, bearing spreading, many-flowered, 2- to 3-chotomous cymes; bracts none; bracteoles minute, ovate-acute; pedicels slender; cyme-branches pedicels and calyx minutely grey-pubescent; flowers yellowish-white; buds cylindric-clavate. *Calyx*-tube short, .03 in. long; lobes 5, ovate-acute, pubescent without, glabrous within except at the tips. *Corolla*-tube cylindrical below, slightly dilated above, glabrous without, sparsely pubescent within below the stamens, mouth contracted, .15 in. long; lobes oblong, rounded, folded in bud and overlapping to the right, as long as the tube, ciliate on the edges and villous at the base within. *Stamens* inserted at the top of the corolla-tube; anthers lanceolate, apiculate, rounded below; filaments short; pollen spherical. *Disk* annular, .025 in. deep. *Ovary* glabrous, ovoid, acute; carpels 2; ovules very many; style slender; stigma cylindric, bifid. *Fruit* of two pendulous follicles reaching 18 in. in length, about .1 to .2 in. in thickness, terete. *Seeds* peltate, on narrow, ribbon-like placentas, oblong, rounded below, slightly bifid and acute above, bordered by tawny hairs which are short at the sides and long plumose, up to .3 in., at the ends; testa very thin, papillose; albumen rather thick; cotyledons oblong, small; radicle as long as cotyledons. A. DC. Prodr. VIII. 409; Hook. f. Fl. Br. Ind. III. 643; Miq. Fl. Ind. Bat. II. 438. *A. costata*, Wall. Cat. 1649, not of Br.

PENANG: *Wallich* 1648, 1649; *Maingay* (K.D.) 1066/2, 1070/2; *Curtis* 378; *King's Collector* 1637, 1732, 1733. — **DISTRIB.** Borneo, Philippines, New Guinea.

6. *ALSTONIA ANGUSTIFOLIA*, Wall. Cat. 1650 (1829). A tall tree; branchlets dark brown, somewhat quadrangular and channelled, stout. *Leaves* nearly coriaceous, ternately whorled or opposite; obovate or oblanceolate, obtusely abruptly acuminate at apex, long cuneately attenuate at base for about half their length; glabrous and green above, pale and glabrous or when young pubescent beneath; margins slightly

recurved, 4 to 6 in. long, 1 to 1.75 in. broad; midrib slender, channelled above; main nerves 12 to 16 pairs, at an angle of from 60° to 70° to the midrib, curving upwards to meet in a very faint intramarginal looped nerve; secondary nerves few; reticulations many, transverse; petiole .5 to 1 in. long. *Inflorescence* pseudo-terminal, sessile, grey-pubescent; peduncles 2 to 6, variable in length, usually from 1 to 2 in. long, ending in branched 2- to 3-chotomous corymbose spreading cymes; bracts none; bracteoles minute, triangular; pedicels slender, short but variable; flowers small, grey-pubescent, white (?), buds shortly clavate. *Calyx*-tube urceolate, glabrous within, .05 to .1 in. long; lobes ovate, reflexed, pubescent on both surfaces, .005 in. long. *Corolla*-tube cylindric, slightly dilated a little above the middle, pubescent on both surfaces, .125 in. long; lobes spreading, .075 in. long, rounded, nearly glabrous within when open, except for the tuft of hairs above the base. *Stamens* inserted a little above the middle of the tube; anthers ovate, apiculate, .035 in. long; filaments very short. *Disk* annulate, wavy at margin, very short. *Ovary* glabrous, ovoid-acute; style slender; stigma conical, penicillate below, bifid above. *Fruit* of two erect (?) follicles, reaching 18 in. in length and .15 in. in diameter, stiff, ribbed when dry. *Seeds* peltate, on narrow, ribbon-like, tough placentas, oblong, rounded below, long acuminate above, .4 in. long, .1 in. broad, bordered by tawny hairs which are short and reflexed at the sides and plumose at the ends, reaching .3 in. in length; testa thin, minutely papillose on the inner, villous on the outer surface; albumen flattened; cotyledons oblong, as long as the straight radicle. A. DC. Prodr. VIII. 409; Hook. f. Fl. Br. Ind. III. 643.

PENANG: *Griffith*; *Maingay* (K.D.), 1066, 1067, 1070. MALACCA: *Derry* 1080. JOHORE: *Ridley* 10942. SINGAPORE: *Wallich* 1650; *Kurz*; *T. Anderson* 140; *Ridley* 2716, 5571.

VAR. *elliptica*, King & Gamble. *Leaves* opposite or in whorls of three, elliptic, acute at apex and at base, glabrous except on the lower surface when quite young; 3 to 4 in. long, 1.25 to 1.75 in. broad; main nerves regular, raised beneath; petiole .75 to 1 in. long with a callus on the inner surface near the base; branchlets rough, dark brown.

PENANG: *Curtis*. Scarcely a variety, but the shape of the leaves is very distinct.

VAR. *latifolia*, King & Gamble. *Leaves* larger, obovate, 5 to 7 in. long, 2.5 to 3 in. broad, glabrous. *Flowers* rather larger; calyx-lobes shallower. A small tree with spreading branches, reaching 15 to 20 feet in height and 3 to 4 in. in diameter.

PENANG: *Maingay* (K.D.) 1070/1, 1070/2; *Curtis* 2491; *Fox* 80; *Ridley* 9306; *Stoliczka*; *King's Collector* 1341.

This species comes very near to *A. villosa*, Blume, of the Malay Archipelago, but we hesitate to join them, as there are important characters of difference, *e. g.*, the very villous inside of the corolla-tube in *A. villosa*.

#### SPECIES IMPERFECTLY KNOWN.

7. *ALSTONIA GRANDIFOLIA*, Miq. Fl. Ind. Bat. Suppl. 555 (1862). A lofty tree; the branchlets very stout, sharply angled, transversely rugose. *Leaves* chartaceous, in whorls of 4 to 6, those of each whorl usually more or less unequal; elliptic-oblong or obovate, acute at apex, gradually narrowed from the middle downwards at the base; brown and glabrous and somewhat shining on the upper, glaucous on the lower, surface; margin undulate; 7 to 13·5 in. long, 2·5 to 5 in. broad; midrib very stout, flat on the upper, much raised on the lower, surface; main nerves 20 to 30 pairs, very regular, parallel, at an angle of from 60° to 70° with the midrib, straight to the margin to meet a nerve which forms the margin itself, all raised beneath; secondary nerves very few, chiefly near the apex; reticulations transverse, forming an elegant network on the lower surface; petiole 1 to 1·25 in. long, stout. *Follicles* elongate, woody (Miq.). Rest unknown.

SINGAPORE: *T. Anderson* 119.—DISTRIB. Sumatra (*Teysmann*).

*A. eximia*, Miq., *l. c.*, seems to differ only in the main nerves being more nearly at right angles (80°) with the midrib. It also comes from Sumatra.

8. *ALSTONIA PANGKORENSIS*, King & Gamble, n. sp. A large tree (?); branches very stout, smooth, somewhat fleshy, grey. *Leaves* membranous; obovate or oblanceolate, abruptly and shortly and bluntly acuminate at apex, cuneate at the base for the lower two-thirds; glabrous above, minutely pubescent beneath, especially on the nerves; margins recurved; 12 to 14 in. long, 4 in. broad; midrib very stout, impressed above, strongly raised beneath; main nerves about 18 pairs, stout, parallel, raised beneath, usually about ·75 in. apart along the midrib, starting at an angle of about 75° and gently curving upwards to the margin; secondary nerves few; reticulations bold, fairly prominent on the lower surface; petiole stout, about ·75 in. long. *Follicles* very slender, 10 to 12 in. long, glabrous, striate, the margins reflexed after the fall of the seeds. Rest unknown.

DINDINGS: Pangkor Island, *Scortechini* 1024.

#### 12. *DYERA*, Hook. f.

Glabrous trees with verticillate branches and thick angular channelled branchlets, laticiferous. *Leaves* in whorls, large, coriaceous, oblong or obovate, with prominent main nerves and long petioles;

stipular ridges between the petioles. *Inflorescence* of pseudo-terminal and axillary umbellately branched cymes; flowers small. *Calyx* 5-lobed, very small, eglandular; tube very short, adnate to the base of the ovary. *Corolla* hypocrateriform, 5-lobed; tube short, hardly dilated opposite the stamens; the throat naked; lobes 5, folded in bud and overlapping to the left. *Stamens* 5, in the middle of the tube, included; filaments very short; anthers oblong-ovoid; cells small; the connective produced in a thickened terminal fleshy appendage. *Disk* annular, obscure. *Ovary* 2-celled, short, entire, conic, obtuse at the top, which is pubescent; style none or minute; stigma obpyriform, minutely bifid at apex; ovules many in each cell on intruded placentæ. *Fruit* of two cylindric follicular mericarps of very large size, connate at the base, at first divergent, afterwards curling back and opening flat. *Seeds* elliptic, large, flat, peltate, surrounded by a broad membranous striate wing, longer at the ends than in the middle; testa very thin, glandular-papillose; albumen flat, rather scanty; cotyledons elliptic, very thin; radicle small, superior.—*DISTRIB.* Three species, of the Malay Peninsula and Archipelago.

Leaves usually under 6 in. long, main nerves starting nearly at right angles to midrib; corolla-tube nearly as long as lobes; cymes with rather short peduncles .. .. 1. *D. costulata*.  
 Leaves under 8 in. long, main nerves starting at about 60° with the midrib; corolla-tube very much shorter than lobes; cymes with long peduncles .. .. 2. *D. laxiflora*.

1. *DYERA COSTULATA*, Hook. f. in Journ. Linn. Soc. XIX. 293 (1882). A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam.; branches verticillate with reddish thick bark; branchlets thick, angular and channelled, at any rate when dry. *Leaves* coriaceous, in whorls of 6 to 8; broadly elliptic or elliptic-oblong, rounded and sometimes very shortly and abruptly acute at apex, rounded at base or sometimes attenuate; upper surface bright green shining, lower pale bluish-green glaucous, especially when young; margins somewhat undulate, slightly recurved; 3 to 7 in. long, 1·5 to 3 in. broad; midrib stout, very prominent beneath, impressed and keeled above; main nerves 16 to 20 pairs, at first nearly at right angles to the midrib, then curving upwards to join in a looped nerve at the margin, raised on both surfaces when dry, as are the prominent reticulations; petiole 1 to 1·25 in. long, ribbed, furnished with a rounded cone-like gland on the upper surface at the base, the glands of the uppermost whorl of leaves conniving in a cone over the bud. *Cymes* pseudo-terminal, or from the penultimate leaf-whorl; peduncles of varying length, 1 to 3 in. long, rather slender branches umbellately whorled; secondary peduncles ·25 to ·5 in. long;

pedicels slender, short; bracteoles triangular, minute; flowers yellowish; buds linear-oblong. *Calyx*-tube adnate to the base of the ovary; lobes ovate rounded, glabrous, .6 in. long. *Corolla*-tube short, .1 in. long, glabrous, except a ring of scanty reflexed hairs within near the base below the insertion of the filament; narrow raised folds between the stamens; lobes oblong, cordate at base, folded in bud, rounded at top, .15 in. long. *Stamens* inserted a little above the base of the corolla-tube; pollen globose with small pits. *Follicles* very large, on greatly thickened peduncles (.5 in. in diam.), 9 to 15 in. long, 1 to 1.5 in. broad, after splitting open nearly 3 in. broad, connate at the base, at first straight, but after dehiscence curved backwards so as nearly to touch at the points. *Seeds* peltate, flat, elliptic, surrounded by a membranous striate wing, broader at the ends than in the middle, 2.5 in. long, 1 in. broad, the seed part 1.25 by .75 in.; testa thin, granular-papillose; albumen thin; cotyledons ovate, .7 by .4 in., very thin and difficult to separate; radicle short. Fl. Br. Ind. III. 644. *Alstonia* ? *costulata*, Miq. Fl. Ind. Bat. Suppl. 556.

PENANG: *Curtis* 339I; *Scortechini* 1973; *King's Collector* 4689, 8181, 8784. MALACCA: *Griffith*; *Maingay* (K.D.) 1097; *Derry* 554. PAHANG: in Tahan Woods, *Ridley* in Trans. Linn. Soc. 2nd Ser. III. 320. SINGAPORE: *Ridley* 4922. — **DISTRIB.** Sumatra (*Teysmann*, *Diepenhorst* 1114).

This is the chief plant that gives the "*Gutta Jehutong*," which seems, however, to be used only as an adulterant of the true *Guttas* given by species of *Palaquium* and *Payena*. *Beccari*, in 'Nelle foreste di Borneo,' 561, says that the *Gutta* of the allied Bornean species *Dyera Lowii*, Hook. f., is absolutely wanting in elasticity, and quickly resinifies and becomes pulverulent.

2. *DYERA LAXIFLORA*, Hook. f. Fl. Br. Ind. III. 644 (1882). A very large tree, reaching 100 to 150 feet in height and 3 to 4 feet in diam.; branches verticillate; branchlets angular, furrowed, rugose, very thick, dark brown. *Leaves* chartaceous, in whorls of 4 to 7; elliptic-obovate or obovate, rounded or shortly acute at apex, rounded at base or especially when young cuneate-attenuate; upper surface bright green glossy, lower glaucous; margins slightly recurved; 6 to 8 in. long, 2 to 3.5 in. broad; midrib prominent, depressed and keeled above, much raised beneath; main nerves 13 to 17 pairs, starting at an angle of about 60° with the midrib, and only very slightly curving upwards to meet in a looped nerve at the margin, slightly impressed above, raised beneath; reticulations many, prominent on both surfaces; petiole 1 to 2 in. long, channelled, furnished at the base with a prominent gland, which, especially those of the uppermost whorl, is recurved, hooked,

and forms a cone over the bud. *Cymes* from the penultimate whorl of the branchlets; peduncles 2 to 5 in. long, slender; branches umbellately whorled; secondary peduncles slender, .75 to 1 in. long; pedicels very slender, about .2 to .3 in. long; bracts leafy, orbicular, petioled, caducous; bracteoles very small, triangular; flowers white; buds linear-oblong. *Calyx*-tube adnate to the lower part of the ovary; lobes orbicular, rounded or sometimes emarginate, glabrous, .05 in. long. *Corolla* salver-shaped; tube urceolate, ribbed without, .075 in. long, glabrous, except a ring of reflexed hairs below the insertion of the filaments; lobes oblong, rather narrow in bud, broad in flower, reaching .2 in. in length and .1 in. in breadth. *Ovary* pubescent on top; stigma sessile, bilobed. *Fruit* not known.

PERAK: *Wray* 541; *King's Collector* 7852 (or 4?). SINGAPORE: *Murton*; *Burbidge*; *Cantley* 226; *Ridley*; *Hullett* 343. Vern. name, "Kayu (wood) Jelutong" (*Wray*).

### 13. HOLARRHENA, Br.

Trees or shrubs. *Leaves* opposite, usually membranous, glabrous or pubescent, penninerved. *Flowers* white, in terminal or axillary or sub-axillary corymbose cymes. *Calyx* 5-fid or 5-partite; lobes narrow, usually glandular at the base on one or both sides. *Corolla* hypocrateriform; tube slender, cylindric, slightly dilated opposite the stamens; the throat contracted, naked; lobes 5, oblong, overlapping to the right. *Stamens* included in the tube near the base; anthers lanceolate mucronate; cells rounded at the base; filaments short, slender. *Disk* none. *Ovary* of 2 distinct carpels; style shortly filiform; stigma below the anthers oblong-fusiform, tip entire or bifid; ovules many in each carpel. *Fruit* of 2 elongate, terete, follicular mericarps. *Seeds* oblong or linear, concave inside, the funicle in the concavity; tipped with a deciduous coma of slender hairs; albumen scanty; cotyledons broad, complicate; radicle short.—DISTRIB. Species 8; 5 in tropical Africa, 3 in India and Malaya.

Leaves over 4 in. long and 2 in. broad, membranous, main nerves irregular; follicles 10 to 15 in. long; cymes broad 1. *H. antidysenterica*.  
Leaves under 4 in. long and 2 in. broad, chartaceous, main nerves regular; follicles 6 in. long; cymes narrow .. 2. *H. Curtisii*.

1. *HOLARRHENA ANTIDYSENTERICA*, Wall. Cat. 1672 (1828). A small tree, glabrous or pubescent; the branchlets slender, lenticellate. *Leaves* membranous, variable; ovate or ovate-oblong to elliptic, obtusely acuminate at apex, rounded or attenuate or cuneate often unequally at base; glabrous above, glabrous or more or less pubescent beneath;

4 to 8 in. long, 2 to 4 in. broad; midrib slender in the glabrous-leaved, broad in the pubescent-leaved forms; main nerves 10 to 14 pairs, irregular, at about  $50^{\circ}$  with the midrib, curved upwards to and along the margin where they anastomose; secondary nerves few or none; reticulations irregular, not prominent; petiole .1 to .2 in. long, sometimes none. *Cymes* many-flowered, dichotomous, 3 to 6 in. in diameter, sessile or shortly peduncled; pedicels slender, .25 to .5 in. long; bracts small, lanceolate, pubescent or glabrous, ciliate; buds clavate; flowers white. *Calyx*-lobes linear-lanceolate, .1 to .2 in. long, ciliate, glandular at base or not; tube scarcely any. *Corolla*-tube slender, .3 to .4 in. long, puberulous, slightly inflated at base; mouth contracted; lobes oblong, acute or rounded at top, infolded in bud, ciliate, .4 in. long. *Anthers* mucronate. *Ovary* glabrous; style short; stigma fusiform. *Follicles* 10 to 15 in. long, .2 in. broad, terete, black, often dotted with white spots, diverging below, then incurved. *Seeds* linear-oblong, channelled on the inner, rounded on the outer, face, .5 to .6 in. long, flattened at the hilum; coma golden-brown, .75 to 1 in. long; cotyledons cordate at base, .4 in. long; radicle .1 in. A. DC. Prodr. VIII. 413; Brandis For. Fl. 326, t. 40; Bedd. Fl. Sylv. CLX. tab. xx. 6; Kurz For. Fl. II. 182; Hook. f. Fl. Br. Ind. III. 644; Cooke Fl. Bomb. II. 133; Prain Beng. Pl. 674. *H. Codaga*, G. Don Gen. Syst. IV. 78; A. DC. l. c. 414; Kurz l. c. 181; Wight Ic. 1297. *H. malaccensis*, Wight Ic. 1298; Miq. Fl. Ind. Bat. II. 441. *H. pubescens*, Wall. Cat. 1673; A. DC. l. c. 413; Miq. l. c. 440. *Echites antidysenterica*, Roxb. *Chonemorpha* (?) *antidysenterica*, G. Don l. c.; Wight Ic. 439. "*Codaga-Pala*," Rheede Hort. Mal. I. t. 47.

MALACCA: *Capt. Wight* cf. Wight Ic. 1298.—DISTRIB. India and Burma.

There are available in the Herbaria of Kew and Calcutta sheets of only one specimen, which is that collected by Capt. Wight, and which was figured in the 'Icones' as *H. malaccensis*. It is a specimen of the glabrous form of the tree, as was to be expected, that being the more usual form in the damp regions of India, as is the pubescent one in the dry regions.

2. *HOLARRHENA CURTISII*, King & Gamble, n. sp. A shrub, reaching 8 feet in height; branchlets slender, dark brown, smooth; innovations pubescent. *Leaves* chartaceous; oblong or oblong-lanceolate or obovate, acute or rounded at apex, attenuate and rounded at base; shining above, pale beneath and minutely pubescent; the margins recurved; 1.5 to 3.5 in. long, .75 to 1 in. broad; midrib thick, prominent beneath; main nerves 12 to 14 pairs, regular, at about  $45^{\circ}$  with the midrib, curving upwards to and along the margin, raised beneath; secondary



nerves occasional; reticulations minute; petiole .1 to .15 in. long, bordered by the decurrent margins of the blade. *Cymes* axillary, corymbose, pubescent, 1.5 to 2.5 in. in diameter, on peduncles .5 to .75 in. long; bracts linear-oblong or spatulate; bracteoles linear, .15 in. long, on the pedicels below the flower; pedicels slender; flowers white; buds clavate. *Calyx*-lobes linear-oblong, .25 in. long, rounded or acute at top, ciliate, pubescent, with 2 glands at the base within; tube almost none. *Corolla*-tube slender, slightly inflated near the base opposite the stamens, contracted at the mouth, .4 in. long, ciliate on the edges, pubescent on both surfaces; lobes oblong, rounded at top, narrowed at the base, the margins infolded in bud, pubescent on both sides. *Anthers* .05 in. long, mucronate. *Ovary* of 2 distinct glabrous carpels; style very short; stigma fusiform, bifid, below the anthers. *Follicles* brown, straight, terete, 6 in. long, .2 in. broad, only little divergent. *Seeds* oblong, keeled on one side, concave on the other, .4 in. long; coma golden-brown, up to 1.5 in. long.

SIAMESE STATES: Trang, at 100 to 200 feet, *Kunstler* 1402; *Curtis* 3392. — *DISTRIB.* N. Siam (*F. H. Smiles*), Cambodia (*Godefroy-Lebœuf* 189).

#### 14. ERVATAMIA, Stapf.

Shrubs or small trees, usually glabrous; branchlets usually dichotomous. *Leaves* opposite, herbaceous to coriaceous, usually membranous when dry; axillary stipules usually distinct; axillary glands small, often numerous. *Flowers* small to middle-sized, sometimes showy, in terminal, pseudo-terminal or axillary cymes, usually corymbose and often in pairs; branches dichotomous. *Calyx* small; lobes 5, free or connate at the base, glandular or not within. *Corolla* salver-shaped; tube cylindric, slightly dilated at the mouth or rarely lower, opposite the stamens; lobes overlapping to the left, rarely to the right. *Stamens* erect, included; filaments short, usually decurrent in ridges inside the tube; anthers linear, bilobed at base, acute or mucronate, dehiscing throughout their length. *Disk* 0. *Ovary* of 2 carpels, distinct or slightly cohering; style long, filiform; stigma clavate, with a slender bifid apiculus; ovules numerous, pluriseriate. *Fruit* of two follicular mericarps, obliquely ovoid to lanceolate or cylindric-lanceolate, often curved and beaked, sometimes 1- to 3-keeled; dehiscing along the ventral suture and at length often opening out flat. *Seeds* few to many, enveloped in a bright-coloured aril, more or less irregularly ellipsoid, grooved or hollowed ventrally; testa crustaceous, finely sulcate, the furrows protruded into the copious often waxy albumen; cotyledons flat, cordate; radicle cylindric.—*DISTRIB.* Species about

30 to 35 in tropical Asia, Australia, and Polynesia; 1 species in Madagascar.

Leaves with main nerves curving upwards; stamens near the top of the corolla-tube:—

Leaves chartaceous or coriaceous; branchlets stout; calyx-lobes thick, broad, short:—

- |                                           |    |    |                          |
|-------------------------------------------|----|----|--------------------------|
| Cymes glabrous or very slightly pubescent | .. | .. | 1. <i>E. corymbosa</i> . |
| Cymes hirsute                             | .. | .. | 2. <i>E. hirta</i> .     |

Leaves membranous; branchlets slender:—

Calyx-lobes very small, under .1 in. long:—

- |                                                                                          |    |    |                             |
|------------------------------------------------------------------------------------------|----|----|-----------------------------|
| Calyx-lobes ovate, acute; follicles oblong, keeled, beak slightly recurved; seeds 3 to 6 | .. | .. | 3. <i>E. coronaria</i> .    |
| Calyx-lobes ovate, rounded; follicles twisted, beak much recurved; seeds 1 to 2          | .. | .. | 4. <i>E. peduncularis</i> . |

Calyx-lobes lanceolate, over .1 in. long:—

- |                                                                                                |    |    |                              |
|------------------------------------------------------------------------------------------------|----|----|------------------------------|
| Calyx-lobes over .3 in. long; follicles 1.5 to 3 in. long, narrowly cylindric, not keeled      | .. | .. | 5. <i>E. cylindrocarpa</i> . |
| Calyx-lobes .15 to .2 in. long; follicles .75 to 1.25 in. long, oblong falcate, 3-keeled       | .. | .. | 6. <i>E. malaccensis</i> .   |
| Calyx-lobes .1 to .15 in. long; follicles 1 to 1.5 in. long, ovoid, long-acuminate, not keeled | .. | .. | 7. <i>E. Curtisii</i> .      |

Leaves with main nerves at right angles to midrib and straight or very slightly curving; branchlets stout; stamens near the middle of the corolla-tube .. .. .

8. *E. polyneura*.

1. *ERVATAMIA CORYMBOSA*, King & Gamble. A shrub or small tree, reaching 30 to 40 feet in height and 8 to 10 in. in diameter; branchlets stout, smooth, uppermost internodes somewhat flattened. *Leaves* chartaceous; elliptic-oblong or elliptic-lanceolate, obtusely acuminate at apex, cuneately narrowed at base; dark green above, pale beneath; margins sometimes slightly recurved; those of each pair often very unequal in size; 6 to 16 in. long, 2 to 6 in. broad; midrib stout, raised beneath; main nerves 12 to 16 pairs, leaving the midrib at an angle of 65° to 75° and at first nearly straight, then curving upwards to and along the margin, usually impressed above and strongly raised beneath; reticulations few, inconspicuous; petiole stout, .5 to .8 in. long, base enlarged half-stem-clasping; axillary glands prominent, meeting at the nodes. *Cymes* many-flowered, much-branched, usually in pairs in the axils of the second uppermost pair of leaves, di-tri-chotomous; peduncles variable, .5 to 2.5 in. long, stout; secondary peduncles similar, 1 to 1.5 in. long; pedicels slender, .5 to 1 in. long, somewhat clavate; bracts obsolete; flowers spreading, corymbose, waxy cream-colour; buds clavate, the top large, globose, often minutely grey-pubescent. *Calyx*-tube campanulate, .5 in. long, thick; lobes ovate, rounded, ciliate, .1 in. long; glands, if present, two at the base of the lobes inside. *Corolla*-

tube cylindric, slender, slightly dilated at top, opposite the stamens, .75 in. long; lobes oblong-falcate, .5 in. long or rather more; pubescent without, crispate on one edge and auricled on that edge at the base. *Anthers* linear-oblong, blunt or mucronate, .125 in. long, the basal lobes adherent to the connective; filaments short, decurrent in lines inside the corolla-tube. *Ovary* of 2 ovoid, glabrous carpels; style filiform; stigma clavate, tip entire or bifid. *Follicles* thick, globular-ovoid, recurved, very shortly beaked, obtusely keeled, rough outside, 1.5 in. long, 1 in. in diameter; ventral suture impressed. *Seeds* very many, oblong-obtuse, deeply hollowed ventrally, .5 in. long, .2 to .25 in. broad and deep; testa crustaceous, glandular-papillose, with deep ridges within, which extend into the copious albumen; cotyledons cordate, .15 in. long; radicle cylindric, .25 in. long. *Tabernæmontana corymbosa*, Roxb. Fl. Ind. II. 25; A. DC. Prodr. VIII. 376; Wall. Cat. 1772 and Bot. Reg. under t. 1273; Hook. f. Fl. Br. Ind. III. 646; Miq. Fl. Ind. Bat. II. 420.

PENANG: *Wallich* 1572; *Phillips*; *Curtis* 1763. PROVINCE WELLESLEY: *Ridley* 7032. PERAK: *Wray* 4169; *King's Collector* 3141, 3522, 5792, 5999, 7163, 7376. MALACCA: *Griffith*. JOHORE: at Jaffaria, *G. King*. SINGAPORE: *T. Anderson* 82, 117; *Murton* 115; *Ridley* 4119, 8416, 8431.

VAR. *Kelsalli*, King & Gamble. *Leaves* thinner than in the type, oblong-lanceolate; main nerves fewer (10 pairs) and at a more oblique angle (50°). *Cymes* nearly sessile, much fewer-flowered.

SELANGOR: at Bukit Etam, *Kelsall* 1992.

VAR. *pubescens*, King & Gamble. *Inflorescence* covered with slight greyish-yellow pubescence.

PERAK: *King's Collector* 4830. MALACCA: *Goodenough* 1638.

This is scarcely a variety. In many of the specimens of the species the corolla in bud is thickly tomentose outside, and thus we have a gradation from the glabrous to the pubescent form.

2. *ERVATAMIA HIRTA*, King & Gamble. A large shrub (?); branchlets stout, somewhat flattened, dark brown, lenticellate. *Leaves* coriaceous; elliptic-ovate or -oblong, long acuminate at apex, acute at base; dull on both surfaces, dark olivaceous-brown on the upper, much paler on the lower; margins recurved; 4 to 12 in. long, 2.5 to 5 in. broad; midrib rather slender, flattened on the upper, raised on the lower surface; main nerves 10 to 15 pairs, starting at about 70° with the midrib and curving upwards to anastomose near the margin, impressed above, raised beneath; secondary nerves apparently none; reticulations obscure; petiole .25 to .5 in. long, stout. *Cymes* almost hirsute, many-flowered, much branched, usually in pairs in the axils of

the second uppermost pair of leaves, 2- to 3-chotomous; peduncles flattened, curved, 1.25 to 1.75 in. long; secondary peduncles similar but rather shorter; pedicels slender, about .5 in. long; bracts and bracteoles obsolete; buds clavate, reaching .75 in. long, nearly glabrous, the top globose. *Calyx* sometimes 7-lobed, cup-shaped, eglandular, hispid without, glabrous within; tube .15 in. long; lobes ovate-acute, as long as tube. *Corolla*-tube cylindric, .5 in. long, slightly inflated opposite the stamens near the top, glabrous; lobes oblong-falcate, crispate on one edge and auricled on that edge near the base, much twisted to the right, .25 in. long (in bud). *Anthers* lanceolate, with a hooked mucro at tip, .075 to .1 in. long, the basal lobes adherent to the connective; filaments short. *Ovary* of 2 ovoid glabrous carpels; style filiform; stigma clavate, with a slender, usually bifid tip. *Follicles* ovoid, falcate, recurved, obscurely keeled and obtusely beaked, 1 to 1.5 in. long by .5 to .75 in. broad, smooth outside, ventral suture impressed before dehiscence. *Seeds* many, crescent-shaped, deeply hollowed ventrally, .5 in. long, .25 in. broad and deep; testa crustaceous, ribbed, and with deep ridges which extend into the albumen; cotyledons ovate, .05 in. long; radicle slender, .1 in. long. *Tabernaemontana hirta*, Hook. f. Fl. Br. Ind. III. 646.

MALACCA: *Griffith*; *Maingay* (K.D.) 1059; *Derry* 77.

This species comes near to *E. corymbosa* var. *pubescens*, but the hirsute inflorescence at once distinguishes it.

3. *ERVATAMIA CORONARIA*, Stapf in Dyer Fl. Trop. Afr. iv. 127 (1902). A shrub; branches many, dichotomous, corky, pale brown. *Leaves* membranous; lanceolate or oblanceolate or oblong-lanceolate, long-acuminate at apex, acuminate at base, the pairs often unequal-sized; deep green on the upper, paler on the lower surface; 3 to 6 in. long, .75 to 1.5 in. broad; midrib slender; main nerves 7 to 9 pairs, distant, curving upwards to and along the margin; secondary nerves and reticulations indistinct; petiole .3 to .4 in. long, slender, the base half-stem-clasping; axillary glands present. *Cymes* few- (2- to 10-) flowered; peduncles 1.5 in. long; pedicels slender, about .25 in. long; bracteoles minute, usually 2 to each pedicel, one below the calyx, one lower down; flowers white, fragrant; buds clavate. *Calyx*-tube short; lobes ovate, acute or rounded, ciliate, biglandular within. *Corolla*-tube slender, .7 to .9 in. long, scarcely dilated slightly below the middle opposite the stamens, pubescent within below the stamens; mouth with flattened glands; lobes as long as the tube, ovate-oblong, obtuse, one edge slightly crispate. *Anthers* lanceolate, .05 in. long, minutely hooked at tip; filaments hairy. *Ovary* of 2 glabrous carpels; style short; stigma cylindric, bifid

at tip. *Follicles* spreading at about  $90^{\circ}$  to  $100^{\circ}$  apart, oblong, 1 to 2 in. long, with 1 to 3 keels and a recurved acuminate tip, opening out flat when fully ripe. *Seeds* 3 to 6, irregularly oblong, angular, .25 in. long, enclosed in a red pulpy aril; deeply grooved ventrally with a branching groove; testa crustaceous, sulcate, glandular, the furrows protruded into the albumen, which is copious; cotyledons ovate-cordate, .1 in. long; radicle cylindric, as long as the cotyledons. COOKE Fl. Bomb. II, 134. *Tabernaemontana coronaria*, Willd. Enum. Hort. Berol. 275; Ait. Hort. Kew. ed. 2, II. 72; A. DC. Prodr. VIII. 373; Roxb. Fl. Ind. II. 23; Wall. Cat. 1568; Wight Ic. 477; Lodd. Bot. Cab. t. 406; Lindl. in Bot. Reg. t. 1064; Dalz. & Gibs. Bomb. Fl. 144; Miq. Fl. Ind. Bat. II. 421; Brandis For. Fl. 322; Bedd. Fl. Sylv. CLIX.; Hook. f. Fl. Br. Ind. III. 646; Trimen Fl. Ceyl. III. 133; Prain Beng. Plants 673. *T. divaricata*, Blume Bijdr. 1626; Kurz. For. Fl. II. 174. *Nerium divaricatum*, Linn. Sp. Pl. 306. *N. coronarium*, Jacq. Coll. I. 138, t. 52; Bot. Mag. t. 1861. *Jasminum zeylanicum*, Burm. Fl. Ind. t. 39.

KASOOM: Curtis 3243. PENANG: back of West Hill at 2000 feet, Curtis 3460. PERAK: King's Collector 5153. MALACCA: at Bukit Burang, Goodenough 1423. SINGAPORE: Wallich 1568.—DISTRIB. Apparently wild in N. India. The shrub is commonly cultivated in gardens throughout India and Malaya.

4. *ERVATAMIA PEDUNCULARIS*, King & Gamble. A small shrub (small tree, King's Collector); branchlets slender, dichotomous, curved. *Leaves* membranous; elliptic or elliptic-oblong or oblong-lanceolate, obtusely long caudate-acuminate at apex, acute at base; glabrous, pale beneath; 4 to 9 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 12 to 20 pairs, parallel, starting at an angle of about  $60^{\circ}$  with the midrib and curving upwards to join in an intramarginal looped nerve; secondary nerves none; reticulations transverse, faint; petiole .25 to .4 in. long, slender at first, afterwards thickening, the base enlarged, half-stem-clasping with a stipular scale within. *Cymes* glabrous, usually in pairs, axillary, on 2 to 5 in. long slender peduncles; branches widely divaricate; secondary peduncles .75 to 1 in. long; pedicels capillary, .2 to .3 in. long; bracteoles minute; flowers white; buds slender, clavate. *Calyx*-tube short; lobes ovate, rounded, glandular within on the middle, .025 in. long. *Corolla*-tube very slender, straight or slightly curved, .4 to .5 in. long, inflated at the top opposite the stamens; mouth naked, slightly pubescent within below the stamens. *Anthers* lanceolate, slightly mucronate. *Ovary* of 2 glabrous carpels; carpels elongate; style very slender; stigma clavate, bifid at apex just beneath the anthers. *Follicles* stipitate, twisted, oblong or rhomboid,

beaked; the beak recurved, .4 to .6 in. long, .4 in. broad, 1- to 2-seeded. *Seeds* bluntly angled, enclosed in a thin red fleshy aril; testa crustaceous, sulcate, the furrows pressing inwards, rough, glandular; albumen copious; cotyledons cordate, .15 in. long; radicle cylindric. *Tabernaemontana peduncularis*, Wall. Cat. 1575 and in Bot. Reg. under t. 1273; A. DC. Prodr. VIII. 376; Miq. Fl. Ind. Bat. II. 421; Hook. f. Fl. Br. Ind. III. 647.

KEDAH: at Langkawi Island, *Curtis* 2536. PENANG: *Porter* (*Wallich* 1575); *Maingay* (K.D.) 1060/2; *Curtis* 790. PERAK: *Curtis*; *Wray* 1892, 1962, 1975; *Scortechini* 83, 226, 724; *Ridley* 9750; *King's Collector* 846, 1858. SELANGOR: *Ridley* 8555. MALACCA: *Derry* 1014.

5. *ERVATAMIA CYLINDROCARPA*, King & Gamble, n. sp. A shrub reaching 4 to 6 feet in height; branchlets slender, dichotomous, pale brown, smooth. *Leaves* membranous; lanceolate, oblong-lanceolate, or elliptic-lanceolate, sharply or sometimes bluntly caudate-acuminate at apex, the acumen curved sideways, attenuate at base; light green above when young, darker when old, paler beneath; 4 to 7 in. long, 1 to 2.5 in. broad; midrib slender; main nerves 7 to 10 pairs, starting at an angle of about 60° to 70° with the midrib, and at once curving upwards to anastomose a little short of the margin; secondary nerves few; reticulations inconspicuous; petiole .25 in. long, slender. *Cymes* axillary or terminal, single or in pairs, divaricately branched; peduncles slender, .5 to 1 in. long; secondary peduncles as long, dichotomously branched; pedicels slender, .25 to .5 in. long; bracteoles minute, very caducous; flowers few in each cyme, waxy white with a yellow centre; buds rather stoutly clavate, acute at tip. *Calyx*-tube very short; lobes lanceolate or linear-lanceolate, unequal, .3 to .4 in. long, acute, with large glands inside near the base, midrib prominent. *Corolla*-tube funnel-shaped in bud, cylindric in flower; dilated above opposite the stamens, .4 to .5 in. long, glabrous on both surfaces; lobes oblong, spreading, rather broad, .5 in. long, rounded at top. *Anthers* linear-acute, .1 in. long; pollen-grains globose, with projecting bosses. *Ovary* of 2 carpels, rounded at top; style slender; stigma clavate, with a bifid point. *Follicles* widely divaricate, from 110° to nearly in the same line, cylindric, acute both at base and tip, scarcely recurved, 1.5 to 3 in. long, not keeled. *Seeds* up to 10, ovoid, .3 in. long, sulcate ventrally, enclosed in a fleshy aril; testa crustaceous, glandular, ribbed, the ribs extending into the copious albumen; cotyledons cordate; radicle cylindric.

PERAK: *Wray* 158, 1857, 2806, 3117, 4027; *Scortechini* 144, 438, 920, 964; *King's Collector* 1060, 2081, 3006, 10061, 10264. DINDINGS: *Ridley*, 7935, 8360, 8631, 10291.

6. *ERVATAMIA MALACCENSIS*, King & Gamble. A slender glabrous

shrub, reaching 6 to 8 ft. in height; branchlets slender, dichotomous, smooth. *Leaves* membranous; lanceolate to elliptic-obovate, obtusely caudate-acuminate at apex, the acumen often twisted sideways, attenuate at base; yellowish-green when fresh, pale brown when dry; 1.5 to 4 in. long, .5 to 1.5 in. broad; midrib slender, raised beneath; main nerves very slender, 6 to 9 pairs, starting at an angle of from 50° to 60° with the midrib, and curving upwards to join in an inconspicuous intra-marginal looped nerve; secondary nerves very few; reticulations few, faint; petiole .5 to .25 in. long, winged by the decurrent margins of the blade, half-stem-clasping at base with a stipular ridge at the node and a ligule-like gland within. *Cymes* axillary, sessile or shortly peduncled, few- (1- to 6-) flowered; pedicels slender, curved, .25 to .75 in. long; bracteoles minute, caducous; flowers white with a yellow centre, or pale yellow; buds very slender, clavate, rounded at top. *Calyx*-tube short; lobes lanceolate, acuminate, glandular within, unequal, .15 to .2 in. long, with a strong midrib nerve. *Corolla*-tube very slender, dilated at top opposite the stamens and there twisted, .5 to .7 in. long, glabrous except for a slight pubescence within below the anthers; lobes narrow, oblong, folded in bud, crisped on the margins, .4 to .5 in. long, .1 in. broad. *Anthers* slender, .15 in. long; filaments short, ciliate, decurrent in lines in the corolla-tube. *Ovary* short, rounded; style long, filiform; stigma clavate, apiculate. *Follicles* yellow, oblong-falcate, beak acute, base sessile; 3-keeled, the keels prominent; .75 to 1.25 in. long, .4 to .5 in. thick, 6- or more-seeded. *Seeds* ovoid or rhomboid, .3 to .4 in. long, surrounded by a reddish aril; testa crustaceous, grooved ventrally with a branching groove, furrowed longitudinally, the furrows intruded into the albumen; albumen copious; cotyledons cordate, rounded, .25 in. long; radicle stout, cylindric. *Tabernaemontana malaccensis*, Hook. f. in Fl. Br. Ind. III. 649.

PERAK: *Scortechini* 2024; *King's Collector* 1061, 4391. MALACCA: *Griffith*; *Maingay* (K.D.) 1061, 1062; *Derry* 87; *Hervey*. SELANGOR: *Curtis* 2353. SINGAPORE: *Hullett* 521 (this specimen has very small leaves and rather larger more recurved follicles).

7. *ERVATAMIA CURTISII*, King & Gamble, n. sp. A shrub; branchlets slender, dichotomous, pale brown, striate when dry. *Leaves* membranous; lanceolate or oblong-lanceolate, caudate-acuminate at apex, attenuate at base; glabrous, green above, pale beneath; margins slightly recurved; 3 to 6 in. long, 1 to 1.5 in. broad; midrib slender, prominent beneath; main nerves 9 to 12 pairs, starting at an angle of about 70° with the midrib and at once curving upwards to and along the margin; secondary nerves and reticulations very indistinct; petiole .2 to .3 in. long, winged by the decurrent margins of the blade so as to be

practically sessile; the base half-stem-clasping and forming a stipular ridge at the node, with a ligule-like gland within. *Cymes* axillary, usually to the second pair of leaves from the top of the branchlet; generally in pairs, about 6- to 10-flowered; peduncles slender, .5 to 1 in. long; pedicels very slender, about .5 to .6 in. long; buds slender, clavate, somewhat acute at tip. *Calyx*-tube almost none; lobes linear-lanceolate, unequal, .1 to .15 in. long, with a large round gland at the base within, usually supporting 3 smaller linear ones. *Corolla*-tube slender, .6 to .7 in. long, slightly inflated at top opposite the stamens, glabrous within and without; lobes narrow, oblong, undulately crispate, .5 in. long. *Anthers* linear, acute or slightly mucronate, .08 in. long; filaments short, decurrent in lines within the tube. *Ovary* of two rounded carpels; style very slender; stigma clavate, bifid at tip. *Follicles* horizontally divaricate, ovoid, long-acuminately beaked, not keeled or recurved, bright orange in colour, 1 to 1.5 in. long, about .4 in. broad. *Seeds* about 6 to 8, obtusely angular, .25 to .35 in. in diameter, deeply hollowed ventrally, enveloped in a crimson aril; testa brown, glandular, furrowed, the furrows deeply indented in the copious waxy albumen; cotyledons cordate, .1 in. in diameter; radicle cylindric, .15 in. long.

PENANG: at the Waterfall. *Curtis* 1775. PERAK: at Kuala Wok, *Wray* 852; *Scortechini* 63.

We have been somewhat in doubt whether *Wray's* and *Scortechini's* fruiting specimens really belong to the same plant as *Curtis's* excellent flowering ones, but after long consideration believe we are right in considering that they do.

8. *ERVATAMIA POLYNEURA*, King & Gamble. A slender glabrous shrub, reaching 20 feet in height; branchlets thick, very milky, dark brown, very prominently marked by the broad scars of fallen leaves. *Leaves* very coriaceous; elliptic or elliptic-ovate or elliptic-oblong, obtuse or bluntly acute at apex, somewhat rounded at base; yellowish-brown when dry, upper surface green when fresh, wrinkled when dry, lower pale, dotted; margins recurved, slightly so in flower, strongly in fruit; 6 to 12 in. long, 2 to 3 in. broad; one of each pair usually smaller than the other; midrib very stout, prominently raised on the lower, depressed and keeled on the upper, surface; main nerves 20 to 35 pairs, parallel, starting at right angles to the midrib and only very slightly curving to meet in a looped intramarginal nerve, all very indistinct, as are the reticulations; petiole stout, .4 to .8 in. long, bordered by the decurrent margins of the blade, bases enlarged, furnished with axillary glands, and those of each pair joined by a stipular ridge. *Cymes* axillary, usually in pairs in the axils of the uppermost pair of leaves but one, dichotomous, 12- to 16-flowered, corymbose;



peduncles very stout, 1·5 to 2·5 in. long; pedicels thick, curved, about ·3 to ·6 in. long; in fruit the non-fruiting pedicels caducous, leaving broad prominent oblong scars; bracts small, entire, rounded; flowers scented; buds clavate, with large obtuse heads, ·3 in. in diameter. *Calyx*-tube short, thick; lobes ovate, obtuse, ·1 to ·15 in. long, with many small subulate glands in a row at the base within. *Corolla*-tube cylindric, ·5 in. long, slightly dilated at two-fifths of the way up, funnel-shaped at the mouth, glabrous on both sides; lobes overlapping to the left, folded in bud, oblong, obtuse, up to 1 in. long. *Stamens* inserted at the dilatation; anthers linear, mucronate, ·15 in. long; pollen-grains globose with small protruded round knobs. *Ovary* of two separate conical carpels; style short; stigma clavate, the apiculus bifid. *Follicles* orange, 1 to 1·5 in. long, ·5 in. broad, falcate, dorsal edge straight, ventral edge much rounded, keels 3; beak long, usually hooked. *Seeds* about 4 to 6, ovoid or rhomboid, enveloped in a scarlet aril, deeply sulcate ventrally; testa crustaceous, glandular, ridged within; albumen copious. *Tabernaemontana polyneura*, Scortechini MS. in Herb. Calc.

PERAK: at Bujoy Malacca, *Scortechini* 1867. MALACCA: *Miller* 9.

A very distinct plant, quite different in texture and appearance to any other herein described, but coming near to *Tabernaemontana dichotoma*, Roxb., of S. India and Ceylon. The description is largely after Scortechini.

### Tribe III.—ECHITIDÆ.

#### Subtribe 1.—PARSONSIINÆ.

##### 15. PARSONSIA, Br.

Twining shrubs. *Leaves* opposite. *Flowers* small, white, in terminal or axillary di-tri-chotomous cymes or thyrses. *Calyx* 5-partite, eglandular or 5-scaled or minutely many-glandular at the base within. *Corolla* tubular; tube short, cylindric or subglobose, naked at the throat; lobes 5, slightly twisted, overlapping to the right. *Stamens* inserted on the tube; filaments often twisted; anthers half-exsert, oblong-lanceolate or linear, acute, conniving round the stigma and adhering to it, the cells produced at the base into empty rigid appendages. *Disk* of 5 lobes or scales. *Ovary* 2-celled; ovules many in each cell; style filiform, dilated at the top, truncate; stigma columnar or elongate-conic. *Fruit* cylindric, of two follicular mericarps, long cohering but at length separating from the two placentas. *Seeds* linear or oblong, attenuate and comose at the apex; albumen scanty; cotyledons oblong-linear, flat; radicle superior.—DISTRIB. About 12 species, of Tropical Asia, Australia and New Zealand.

Filaments of the stamens twisted spirally around the style; corolla-lobes .2 in. long:—

- Leaves more or less oblong, with 6 to 8 pairs of main nerves; corolla glabrous without; fruit 4 to 7 in. long .. 1. *P. spiralis*.  
 Leaves more or less ovate, with 10 to 12 pairs of main nerves; corolla pubescent without; fruit 2.5 to 3 in. long .. 2. *P. Kunstleri*.

Filaments of the stamens not twisted spirally around the style:—

- Corolla-tube cylindric-urceolate, lobes spreading, .075 in. long; disk deeply lobed; calyx-lobes with no or very small scales at base within; main nerves of leaves 6 to 8 pairs .. 3. *P. stenocarpa*.  
 Corolla-tube campanulate, lobes erect, .3 in. long; disk entire or undulate; calyx-lobes with a broad thin scale at base within; main nerves of leaves 8 to 10 pairs .. 4. *P. penangiana*.

1. *PARSONSIA SPIRALIS*, Wall. Cat. 1631 (1828). An evergreen twining glabrous shrub; branchlets terete. *Leaves* subcoriaceous when green, membranous when dry; ovate-oblong or oblong-lanceolate, shortly somewhat abruptly and often obliquely acuminate at apex, acute or rounded at base; pale when dry, especially on the lower surface; 3 to 7 in. long, 1.5 to 3.5 in. broad; midrib rather broad, slightly raised beneath; main nerves 6 to 8 pairs, the lowest pair close to the base, starting at an angle of about 60° and arching upwards to anastomose near the margin; secondary nerves few, also the reticulations; petiole slender, .5 to 1 in. long, often twisted at base; stipular glands small, subulate, the bases of each pair connected by a stipular ridge. *Cymes* axillary, many-flowered, corymbose, 1.5 to 3 in. in diameter; peduncles variable in length, 1 to 4 in. long; secondary peduncles usually 3, .5 to 1 in. long; branches usually 3-chotomous; ultimate pedicels slender, about .25 in. long; bracts and bracteoles small, ovate; flowers greenish or yellowish with a red centre; buds clavate, with short tube and obtusely conical top. *Calyx*-tube short; lobes ovate, acute, ciliate, sparsely pubescent without, .1 in. long, furnished with an ovate-acute sometimes bifid scale at the base of each inside. *Corolla*-tube cylindric, .125 in. long, glabrous on both surfaces, villous at the throat; lobes .2 in. long, oblong, acute, erect or spreading. *Disk*-lobes triangular. *Stamens* inserted near the base of the tube; the filaments spirally twisted together, sparsely pubescent; anther-tails incurved at the base, anther-tips acuminate, hooked. *Ovary* ovoid, glabrous; style slender; stigma columnar with a bifid apex and short basal auricular ring. *Fruit* linear-lanceolate, acuminate, 4 to 7 in. long, .75 in. broad, somewhat compressed, smooth, striate, glabrous. *Seeds* .5 to .75 in. long, slender, enlarged below, narrowed and cut away on one side above, and furnished with pale golden-brown coma, .75 to 1.5 in. long; cotyledons narrow, oblong, about .25 in. long; radicle

·1 in. long, slender. A. DC. Prodr. VIII. 402; Kurz For. Fl. II. 180; Hook. f. Fl. Br. Ind. III. 650; Trimen Fl. Ceyl. III. 134; Cooke Fl. Bomb. II. 135. *P. oblonga*, Wall. Cat. 1632; A. DC. l. c. *P. pauciflora* and *P. acuminata*, Wall. Cat. 1633, 1634. *Helygia javanica*, Blume Bijdr. 1043. *Heligme javanica*, A. DC. l. c. 425; Miq. Fl. Ind. Bat. II. 429. *H. Rheedii*, Wight Ic. t. 1303. *Spirostemon spiralis*, Griff. Notul. IV. 80, t. 411, fig. 1. *Aganosma concanensis*, Hook. Ic. Pl. t. 841. "*Kudici Kodi*," Rheed Hort. Mal. IX. t. 9, 10.

KEDAH: on Lankawi Island, *Curtis*; at Coah, *Curtis* 450, 2109.

PENANG: *Wallich* 1634; *Curtis* 1707. PERAK: *Wray* 2244. MALACCA: *Maingay* (K.D.) 1064. SINGAPORE: *Wallich* 1633; *Lobb*; *Kunstler* 69.

—DISTRIB. India, Ceylon, Burma, Malay Archipelago, China.

2. *PARSONSIA KUNSTLERI*, King & Gamble, n. sp. A slender climbing shrub; branchlets terete, pale to dark brown. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or acute at base; yellowish-green when fresh with reddish nerves beneath, dark brown and dull when dry, lower surface paler; sometimes slightly puberulous, especially on the nerves beneath; 3 to 6 in. long, 1·5 to 3 in. broad; midrib slender, raised above and sinuate when dry, raised beneath; main nerves 10 to 12 pairs, the lowest usually close to the margin, starting at an angle of 60° and curving upwards to and along the margin, raised on both surfaces when dry; secondary nerves few, chiefly between the upper main nerves; reticulations obliquely transverse, prominent on the lower surface; petiole slender, twisted, variable in length from ·25 to 1·25 in. long, the base swollen, those of each pair joined by a nodal ridge with small acute stipular glands. *Cymes* axillary, corymbose, many-flowered, 2-chotomous, reaching 7 in. in length and about 3 in. in diam.; peduncles slender, curved, 3 to 5 in. long; secondary peduncles usually 3, 1·5 to 2 in. long; cymules about 10- to 12-flowered; pedicels slender, ·15 to ·25 in. long; bracteoles ovate-acute, puberulous, ·05 to ·1 in. long; buds clavate, with short tube and conical head; flowers dark yellow without, reddish within. *Calyx*-tube short; lobes ovate, acute, ciliate, pubescent without, ·1 in. long, furnished each with an ovate acute, sometimes emarginate scale at its base within. *Corolla*-tube cylindric below, ·15 in. long, pubescent without, villous within at the mouth and between the filaments; lobes oblong, acute, ·2 in. long, pubescent without, glabrous within. *Disk*-lobes triangular, blunt; ·025 in. long, glabrous. *Stamens* inserted near the base of the tube; the filaments twisted, sparsely villous; anther-tails incurved at the base, anther-tips blunt with a small membranous tip. *Ovary* ovoid, glabrous; style slender; stigma columnar with a conical sometimes bifid tip and basal spreading annular ring. *Fruit* linear-lanceolate,

acuminate, 2·5 to 3 in. long and ·2 to ·3 in. broad, glabrous, terete, slightly compressed, the mericarps at length separating. *Seeds* slender, ·4 to ·5 in. long, narrowly linear, constricted above and acuminate below, tipped with a 1 in. long coma of pale silky hairs; cotyledons narrow; radicle slender.

PERAK: in low-lying localities, *Kunstler (King's Collector)* 1824, 5650.

3. *PARSONSIA STENOCARPA*, King & Gamble, n. sp. A slender twining shrub; branchlets terete, older somewhat channelled; innovations minutely rusty-pubescent. *Leaves* membranous; ovate-lanceolate shortly acute at apex, cuneate or sometimes slightly rounded at base; both surfaces sparsely but minutely pubescent when young, glabrous when old; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib slender; main nerves 6 to 8 pairs, slender, at about 50° with the midrib, the lowest pair less, curving upwards to anastomose near the margin, faint but apparent on the lower surface, as are the reticulations; petiole variable in length, ·25 to 1 in. long, slender, often twisted near the base; stipular glands very small. *Cymes* axillary, few- (8- to 10-) flowered, umbellate, pubescent; peduncles about 1 in. long; pedicels slender, ·2 in. long in flower, ·3 in. long and rather thick in fruit; bracteoles minute, subulate; flowers light yellow; buds short, oblong-conical. *Calyx*-tube very short; lobes ovate-acuminate, ·125 in. long; scales very small or none. *Corolla*-tube cylindric-urceolate, ·15 in. long, densely pubescent within in the upper part; lobes ovate-acuminate, spreading, ·075 in. long. *Disk*-lobes oblong, emarginate, ·025 in. long. *Stamens* inserted near the base of the corolla-tube; filaments slender, radiating to the centre, but not spirally twisted; anthers hastate acuminate, the tails spreading outwards. *Ovary* ovoid-conical; style slender; stigma columnar with a bifid apiculus at tip and a ring at base. *Fruit* linear, terete, 5 to 7 in. long, ·2 in. broad, rather quickly separating into two terete mericarps; placentas flat, very thin. *Seeds* ·5 in. long, slender, slightly enlarged below, narrowed above and furnished with a coma of golden-silky hairs about 1 in. long; cotyledons oblong, ·15 in. long; radicle slender, ·1 in. long.

PERAK: *Scortechini* 1292; *Wray* 3263; *King's Collector* 6062—in dense jungle, at 300 to 500 feet, clinging to trees.

*P. curvisepala*, K. Schum., of New Guinea, is very near this indeed, and scarcely seems to differ, except in the greater hairiness, in the corolla-lobes being quite valvate (*Lyonsia*?), and in the calyx-lobes being much recurved.

4. *PARSONSIA PENANGIANA*, King & Gamble, n. sp. A climbing shrub; branchlets slender, dark brown, terete, internodes long. *Leaves* membranous; ovate, acuminate at apex, truncate or rounded at base;

both surfaces olivaceous brown, the lower the paler; margin slightly recurved; 5 to 7·5 in. long, 3 to 4 in. broad; midrib slender, prominent beneath; main nerves 8 to 10 pairs, the lowest pair close to the margin, those succeeding gradually further apart to above the middle, at an angle of 60° to 70° with the midrib, curving upwards to anastomose near the margin; secondary nerves none; reticulations transverse, distant, oblique; petiole 1 to 1·25 in. long, slender, bordered above by the decurrent margins of the blade. *Cymes* in axillary, corymbose, puberulous panicles; peduncle slender, 1·5 in. long, flattened; branches few, also flattened but shorter; bracteoles ovate, acute; pedicels 1 to 2 in. long, slender; buds ovoid, acute; flowers yellowish-white. *Calyx*-tube short; lobes triangular-ovate, 0·75 in. long, bluntly acuminate, ciliate, each with a broad short very thin scale nearly equalling the base within. *Corolla*-tube campanulate, not at all constricted, 3 in. long; lobes as long as tube, ovate-acute, the tip entire or notched, pubescent without, glabrous within, except the shaggy-villous ring at the insertion of the filaments. *Stamens* half-exsert, inserted a little below the top of the tube; filaments long, shaggy-villous, curved inwards to meet and then upwards but scarcely spiral; anthers long, sagittate, the spurs much incurved, the tip membranous-apiculate. *Disk* cylindrical, entire or slightly undulately lobed, 0·6 in. high, glabrous, fully enclosing the carpels. *Carpels* rounded, glabrous, at first connate, afterwards separating; style slender, conical above; stigma conical, with a spreading ring below and short often bifid tip. *Fruit* unknown.

PENANG: at the Waterfall, *Curtis*.

*Curtis* says this is a rare plant. It differs from the other species in the not constricted campanulate corolla-tube, the very broad scale at the base of the calyx within, and the entire cylindrical disk. When the fruit is known it may perhaps be found to require a new genus.

#### 16. VALLARIS, Burm.

Climbing or erect shrubs, or trees. *Leaves* opposite, minutely dotted. *Flowers* white, in axillary fascicles or in dichotomous pseudo-axillary cymes. *Calyx* 5-partite, glandular or not within; lobes narrow. *Corolla* hypocrateriform or subrotate; throat naked; tube short; lobes broad, contorted, overlapping to the right. *Stamens* inserted at the top of the tube of the corolla, partly exsert; filaments short; anthers sagittate, acuminate, conniving in a cone around and adherent to the stigma; the connective furnished with a large or small dorsal gland; cells with rigid basal spurs. *Disk* annular or cupular, with 5 lobes or scales. *Ovary* of 2 carpels, which are at first connate; ovules many in each carpel; style filiform; stigma thick, obscurely annular at base, often 2-lobed at the tip. *Fruit* oblong, acuminate, separating into 2

follicular mericarps. *Seeds* biseriate, ovate, acuminate or beaked, the apex furnished with a coma; albumen scanty or copious; cotyledons thin or fleshy, large; radicle cylindric, superior.—**DISTRIB.** Tropical Asia, in India and Malaya; species 5 or 6.

A climbing shrub; flowers in branching cymes; anthers with a large dorsal gland .. .. 1. *V. Pergulana*.

Shrubs or trees; flowers in fascicles:—

Flowers large; leaves 3 to 4·5 in. long, ·75 to 2 in. broad;

anthers with a large dorsal gland .. .. 2. *V. Maingayi*.

Flowers small; leaves 1 to 2 in. long, ·5 to ·75 in. broad;

anthers with a small dorsal gland .. .. 3. *V. lancifolia*.

1. **VALLARIS PERGULANA**, Burm. Fl. Ind. 51 (1768). A climbing shrub, with an unpleasant odour; branchlets terete, pale brown. *Leaves* membranous; broadly elliptic or obovate, abruptly and shortly acute at apex, cuneate at base or sometimes rounded; both surfaces glabrous, the lower sometimes puberulous especially on the nerves; 4 to 7 in. long, 3 to 4 in. broad; midrib slender, impressed above; main nerves 7 to 9 pairs, at an angle of from 50° to 60° with the midrib, straight at first, curving and anastomosing near the margin, the upper ones meeting a looped nerve; secondary nerves very few; reticulations transverse, prominent; petiole ·75 to 1·5 in. long, slender. *Cymes* lax, usually supra-axillary, puberulous, reaching 3 in. in length and 4 in. in breadth; peduncles short, under ·5 in. long; branches dichotomous; pedicels slender, ·25 to ·5 in. long; buds obovate, acute; flowers white. *Calyx*-tube very short, pubescent without; lobes lanceolate, acuminate, ·3 in. long, pubescent; glands very small, alternate with the lobes. *Corolla*-tube hypocrateriform; tube short, cylindric, ·2 in. long, nearly glabrous; limb ·35 in. long, cleft half-way down in ovate abruptly acuminate lobes, pubescent on both sides. *Disk* of 5 rounded villous lobes, incurved at tip. *Stamens* inserted near the top of the tube within; filaments thick, partly decurrent; anthers sagittate, short-apiculate, exserted, ·2 in. long, the tails slender incurved, the dorsal surface with a large fleshy glabrous rounded gland at the forking of the cells. *Ovary* rounded, densely white-villous; style slender; stigma conical, with a rounded tip and bifid apiculus. *Fruit* not known. A. DC. Prodr. VIII. 399; Wight Ic. t. 429; Hook. Ic. Pl. t. 153 (*V. Pergularia* by error); Hook. f. Fl. Br. Ind. II. 651. *V. ovalis*, Miq. Fl. Ind. Bat. II. 427. *Pergularia glabra*, Linn. Mant. 53. *Emericia Pergularia*, Roem. & Sch. Syst. IV. 401. *Echites hircosa*, Roxb. Fl. Ind. II. 18. "*Flos Pergulanus*," Rumph. Herb. Amb. V. 51, t. 29, fig. 2.

MALACCA: Griffith; Maingay (K.D.) 1063, cultivated. — **DISTRIB.** India (Bengal?), Ceylon, Malay Archipelago, Siam.

2. *VALLARIS MAINGAYI*, Hook. f. in Fl. Br. Ind. III. 651 (1882). A large tree (Maingay), a tree 40 to 50 feet high (Curtis); branches stout, with black bark; branchlets closely ringed with transverse cracks. *Leaves* coriaceous; elliptic-lanceolate, obtusely acuminate at apex, acuminate at base; upper surface dark greenish-brown, lower pale, glabrous; 3 to 4·5 in. long, ·75 to 2 in. broad; midrib slender, impressed above; main nerves 5 to 6 pairs, prominent beneath, curving upwards to and along the margin; secondary nerves and reticulations distinct beneath; petiole ·2 to ·4 in. long, black. *Flowers* fascicled, 4 to 12 together in one of the axils of each pair of leaves, on alternate sides; the base of the fascicle forming a short tubercle; pedicels variable in length, ·2 to ·5 in., slender or stout, slightly enlarged under the calyx; bracts or bracteoles none; buds about ·5 in. long, tube and conical head of lobes about equal. *Calyx*-tube short; lobes ovate, acute, ciliate, ·06 in. long; glands alternate with the lobes, very small. *Corolla*-tube urceolate, ·25 in. long, mouth constricted; lobes broad, ovate-oblong, folded in bud, ·3 in. to ·4 in. long, pubescent on the inner surface. *Anthers* half-exserted, apiculate, hairy on the ventral surface, a line of hairs near the tip on the dorsal surface; dorsal gland large. *Disk* annular, glabrous, with 5 rounded lobes, ·05 in. high. *Ovary* conical, pubescent, of two combined carpels; style slender; stigma conical, ringed and hairy below. *Fruit* not known.

PENANG: at Batu Feringy and at Government Hill, 2,000 feet, Curtis 1767, 2748. MALACCA: *Maingay* (K.D.) 1084. SINGAPORE: Ridley 4917.

Haviland's 3050 from Kalong, Borneo, is clearly a species closely allied to this.

3. *VALLARIS LANCIFOLIA*, Hook. f. Fl. Br. Ind. III. 651 (1882). A rather stiff epiphytic shrub; branches stout, dark greyish-brown, somewhat angled, studded with many conspicuous corky wart-like lenticels; branchlets very slender, pale grey, twiggy. *Leaves* chartaceous; ovate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces; 1 to 2 in. long, ·5 to ·75 in. broad; midrib slender; main nerves very oblique; inconspicuous, parallel, 8 to 10 pairs, joined by an intramarginal slightly looped nerve; reticulations oblique, indistinct; petiole slender, ·1 to ·25 in. long. *Cymes* axillary, few-flowered, short (about ·5 in. long); peduncles about ·1 to ·2 in. long, slender; pedicels very slender, ·25 in. long; bracteoles minute, ovate-acute; flowers white. *Calyx*-lobes ovate, acute, ciliate, with 2 rounded fimbriate scales at the base of each; tube as long as lobes. *Corolla* hypocrateriform; tube cylindric, ·15 in. long, narrowed upwards, pubescent within; lobes linear-oblong, ·2 in. long, villous at the throat. *Disk* 5-lobed; lobes erose. *Stamens*

inserted near the top of the tube; filaments slender; anthers half-exsert, sagittate, the tip membranous, the spurs slender, rather short; dorsal gland narrow, inconspicuous. *Ovary* of 2 glabrous ovate carpels; style slender, with a cup-shaped top; stigma almost globose, with a short tip. *Fruit* not seen.

PENANG: on Government Hill, 1,900 feet, *Fox* 33; *Curtis* 2146. PERAK: at Goping, *King's Collector* 4273. MALACCA: *Maingay* (K.D.) 1102.

#### 17. POTTSIA, Hook. & Arn.

Climbing shrub. *Leaves* opposite, with distant nerves. *Flowers* small, in lax large terminal and axillary trichotomous paniculate cymes. *Calyx* small, 5-partite, with a ring of small glands within at the base of each lobe. *Corolla* hypocrateriform; tube cylindric, constricted and naked at the throat; lobes 5, overlapping to the right, only slightly twisted, spreading. *Stamens* inserted at the mouth of the corolla-tube; filaments short; anthers exsert, sagittate, connivent in a cone round the stigma; cells with basal empty spurs. *Disk* annular, deeply 5-lobed. *Ovary* of 2 distinct carpels; style thickened in the middle, attenuate at base and under the ovoid-conical stigma; ovules many in each carpel. *Fruit* of two follicular mericarps, which are thin, terete, subtorulose. *Seeds* linear, elongate, not beaked, with a deciduous coma; albumen copious; cotyledons linear, flat; radicle superior. — **DISTRIB.** One species, Indian and Malayan.

POTTSIA CANTONENSIS, Hook. & Arn. Bot. Beech. Voy. 199, t. 43 (1836). A large climbing shrub; branches terete, cylindric; branchlets and innovations puberulous. *Leaves* membranous; ovate or elliptic-ovate, acuminate (usually abruptly and obtusely) at apex, rounded or subcordate at base; glabrous above, also beneath except for slight pubescence along the midrib; 2 to 4 in. long, 1 to 2·5 in. broad; midrib slender, much raised beneath; main nerves 5 to 6 pairs, distant, curved upwards to and along the margin; reticulations in a fine net-work; petiole slender, .75 to 1 in. long, minutely pubescent, the bases of each pair joined in a thin ridge at the nodes. *Inflorescence* 4 to 6 in. long, 6 to 10 in. broad at top; of trichotomous panicles ending in corymbose drooping cymes; primary peduncles 2 to 4 in. long, slender; secondary 1 to 2 in. long; rest slender, all rusty puberulous or glabrate; pedicels very slender, .5 in. long; basal bracts leafy; bracteoles minute, ovate, ciliate, caducous; buds slender, clavate; flowers pink. *Calyx*-tube very short; lobes ovate, each with 1 to 4 minute scales at the base inside. *Corolla*-tube cylindric-campanulate, slightly constricted at mouth, .15 to .2 in. long; lobes spreading, ovate, .15 in. long, 3-nerved, margins recurved. *Anthers* sagittate, smooth on the back with a very small



gland near the apex, which is often hooked; basal cells slender, incurved; filaments pubescent, decurrent inside the corolla-tube in a white-pubescent ridge to a little way above the base. *Disk-lobes* linear-subulate, .1 in. long. *Ovary*-carpels short, oblong, pubescent at top; stigma obscurely ribbed. *Follicles* very slender, 1 foot long, flexuous, smooth, thinly coriaceous. *Seeds* black, very slender, glabrous, flat, 1 in. long, .075 in. broad, enlarged at the apex where they bear the coma; coma white, 1 to 1.5 in. long; albumen thin; cotyledons linear-oblong; radicle slender. Benth. Fl. Hongk. 222; Kurz For. Fl. II. 190, and Journ. As. Soc. Beng. XLVI. ii. 255; Miq. Fl. Ind. Bat. II. 450. *P. ovata*, A. DC. Prodr. VIII. 442. *P. Hookeriana*, Wight Ic. t. 1306 bis. *Parsonsia ovata*, Wall. Cat. 1630. *Teysmannia laxiflora* and *Hookeriana*, Miq. l. c. 455, 456; and *Parapottsia*, Addenda 1080. *Vallaris laxiflora*, Blume Bijdr. 1043. *Euthodon paniculata*, Griff. Notul. IV. 84; Ic. Pl. Asiat. t. 458, fig. 2.

KEDAH: Ridley. PENANG: Curtis 820. PERAK: Wray 1904; Scortechini 1287, 1289; Curtis 3337; King's Collector 1318, 4657, 5532, 10292, 10988. MALACCA: Griffith; Maingay (K.D.) 1095. — DISTRIB. India (E. Bengal and Assam), Burma, Java, S. China.

# 18. WRIGHTIA, Br.

Shrubs or small trees, with often slender branches. *Leaves* opposite, penniveined. *Flowers* red, white, or yellowish, in terminal or pseudo-axillary corymb-like cymes. *Calyx* short, 5-partite, with glands or scales inside; lobes obtuse. *Corolla* hypocrateriform; tube cylindric, usually short, usually slightly constricted at the throat; lobes 5, overlapping to the left; the throat or the lower part of the lobes usually (absent in *W. religiosa*) furnished with a *corona* of 5 to 10 scales, which are often lobed or fimbriate, and either distinct or connate in a ring. *Stamens* inserted on the mouth of the tube; filaments short, dilated; anthers exserted (almost included in *W. dubia*), sagittate, conniving around and adhering to the stigma; cells usually near the summit, base produced in solid spurs. *Disk* 0. *Ovary* of 2 free or connate, many-ovuled, carpels; style filiform; stigma ovoid, with usually a toothed basal ring. *Fruit* of 2 connate or distinct follicular mericarps. *Seeds* linear, attenuate at the apex, base with a deciduous coma; albumen scanty or 0; cotyledons broad, convolute; radicle short, superior.—DISTRIB. Tropical Asia and Australia; about 10 species.

Throat of corolla furnished with a corona of scales or fringes:—

Corona-scales 10, 5 alternate with lobes of corolla, free, 2-lobed; 5 opposite those lobes, adnate below, free above,

3-lobed; leaves and inflorescence very tomentose; follicles connate .. ..	1. <i>W. javanica</i> .
Corona-scales many, fimbriate from the base; leaves and inflorescence glabrous; follicles connate .. ..	2. <i>W. laevis</i> .
Corona-scales 5, small, alternate with the lobes of the corolla, not lobed; stamens almost included; flowers large; leaves scarcely pubescent; follicles distinct, connate at the tip only .. ..	3. <i>W. dubia</i> .
Throat of corolla without a corona; flowers very small as are also the leaves; pedicels capillary; follicles distinct ..	4. <i>W. religiosa</i> .

1. *WRIGHTIA JAVANICA*, A. DC. Prodr. VIII. 405 (1844). A small tree, reaching a height of 40 feet and a diameter of 12 to 14 in. (Curtis); branchlets slender, tomentose, as are the innovations and linear leaf-buds. *Leaves* membranous; elliptic or elliptic-lanceolate, abruptly and obtusely acuminate at apex, acute at base; upper surface minutely pubescent, glabrate when old; lower surface densely tomentose with ferruginous hairs; 3 to 5 in. long, 1 to 2.5 in. broad; midrib rather broad, scarcely raised; main nerves 10 to 12 pairs, nearly straight, reddish and sufficiently conspicuous beneath; reticulations obscure; petiole .25 in. long, densely tomentose. *Cymes* terminal, tomentose, 1 to 1.5 in. long and 2 to 3 in. broad, many- (about 15- to 20-) flowered; peduncle none, or about .25 in. long; branches 3-chotomous, about .4 in. long; pedicels slender, .2 to .3 in. long; bracteoles minute, subulate; buds clavate, the tube short, the head ovoid, inflated, often .5 to .6 in. long and .2 to .3 in. broad; flowers pale waxy-white with greyish centre. *Calyx*-lobes ovate, acute, glabrous within, .05 in. long; glands 2 to each lobe, elliptic, the two nearly covering the inside of the lobe. *Corolla*-tube short, .15 in. long, slightly constricted at mouth, glabrous within; lobes oblong, rounded, .5 in. long, at last spreading, puberulous on both surfaces. *Scales* 10; 5 alternate with corolla-lobes, free, inserted at base, .2 to .3 in. long, entire or bifid at apex, villous; 5 opposite the corolla-lobes, upper free part inserted nearly half-way up, very short and 2- to 3-lobed, villous, lower part adnate to the tube, glabrous or pubescent, twice as broad as the free ones. *Anthers* hard, stiff, pubescent, .25 in. long, apiculus penicillate; filaments very short, thick, sometimes furnished behind with 2 minute subulate glands. *Fruit* 10 to 12 in. long, rough, prominently beaked; follicles connate. *Seeds* very slender, about .6 in. long, excavate above; testa thin, striate; coma white, silky, 1.5 to 2 in. long; cotyledons broadly ovate, cordate, convolute, .25 in. long, with prominent nerves; radicle short, stout, .075 to .1 in. long. Miq. Fl. Ind. Bat. II. 432; Koord. & Val. Bijdr. I. 112. *W. pubescens*, Blume Bijdr. 1041 not of Br.

KEDAH: at 300 to 500 feet, *King's Collector* 1762, TONGKA: *Curtis*

3054. PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3738. —  
DISTRIB. Java (Koorders 13799, 13800, 13802, 14232).

In appearance this species would at first sight be taken for *W. tomentosa*, Roem. & Sch., but it is distinguished by the larger buds, shorter corolla-tube, and, above all, by the quite different corona-scales.

2. *WRIGHTIA LÆVIS*, Hook. f. in Fl. Br. Ind. III. 654 (1882). A glabrous shrub or small tree, reaching 15 to 20 feet in height; branchlets slender, terete, very pale brownish-yellow. *Leaves* membranous; elliptic or elliptic-oblong, abruptly caudate-acuminate at apex, cuneate at base; shining above, dull and pale beneath, blueish when dry; 3 to 6 in. long, 1 to 3 in. broad; midrib slender, raised and usually nearly white beneath; main nerves 4 to 7 pairs, the lowest pair very near the margin, all arching upwards to and along the margin; secondary nerves and transverse reticulations pale, forming an elegant network especially conspicuous below; petiole very short, .1 to .2 in. long. *Cymes* corymbose, 3-chotomous, pseudo-terminal, about 2 in. long and 2.5 in. broad; peduncles flattened, up to about 1 in. long; secondary peduncles also flattened, .25 to .3 in. long; pedicels slender, .5 to .75 in. long, often deflexed; bracteoles minute, ovate-lanceolate; flower-buds ovoid; flowers about .5 in. in diameter, blood-red (Maingay). *Calyx*-tube very short; lobes ovate, rounded, ciliolate, nerved, .06 in. long, each with 1 to 2 minute scales near the base. *Corolla*-tube very short, .05 in. long, glabrous; lobes oblong, minutely pubescent, .25 in. long; corona-scales fimbriate from the base, laciniae glabrous, .2 in. long. *Stamens* exsert; filaments very short, thick; anthers sagittate, the connective villous on both sides; cells near the top only, very short. *Ovary* ovoid, glabrous; style slender, with an obconic top; stigma short, rounded. *Follicles* 7 to 8 in. long, connate, slender. *Seeds* very long (1.5 in.), slender, glabrous, striate.

POONGAH: *Curtis* 2943. PERAK: at 300 ft., *Wray* 3504; *Scortechini* 63, 77; *King's Collector* 8614. MALACCA: on Mount Ophir, *Maingay* (K.D.) 1065. SELANGOR: *Ridley* 7566, at Ginting Bidai.—DISTRIB. Sumatra (*Forbes* 2605).

3. *WRIGHTIA DUBIA*, Spr. Syst. Veg. I. 638 (1825). A shrub, 2 to 8 feet high; branches stout, lenticellate; branchlets also thick, terete, pale brown, innovations minutely pubescent. *Leaves* chartaceous; oblong- or obovate-lanceolate, acuminate at apex, attenuate at base, sometimes almost rounded; dull on both surfaces, on the upper scaberrulous, scarcely pubescent, dark, paler beneath; 3 to 6 in. long, 1 to 1.5, rarely to 2, in. broad; midrib slender, smooth, pale, prominently raised beneath; main nerves 8 to 12 pairs, the lowest very close to the margin,

the rest at irregular distances but rather oblique, arching upwards to and along the margin; secondary nerves few, reticulations distinct, all pale and easily seen on the lower surface; petiole extremely short, 0 to .2 in. long. *Cymes* axillary and pseudo-terminal, few- (1- to 6-) flowered, secund; peduncles very short; pedicels pubescent, .25 in. long; bracteoles very small, pubescent, ovate-acute, sheathing the bases of the pedicels and at intervals along them; buds oblong-ovoid or fusiform, 1 to 1.5 in. long; flowers scarlet, orange without. *Calyx*-tube short; lobes ovate-acute, ciliolate, otherwise glabrous, .125 in. long, 3 of them with two small, thin, rounded, membranous, lobed scales at base, the scales one-third to one-half the length of the lobes. *Corolla* hypocrateriform; tube campanulate, .25 to .35 in. long; lobes spreading, .4 to .5 in. long, linear-oblong or -acuminate, glabrous on both surfaces as in the tube; mouth with 5 small, ligulate, rounded, corona-scales alternate with the lobes and sometimes joined by a slightly thickened ridge. *Stamens* only slightly exsert; filaments very broad; anthers sagittate, produced in a short membranous tip, the basal spurs straight or incurved; connective faintly pubescent on the back. *Ovary* glabrous, conical; style thick, .1 in. long; stigma conical, with an annular ring. *Follicles* distinct, at first cohering at the apex, 8 to 12 in. long, .25 in. broad, acuminate, striate. *Seeds* linear, .75 in. long, pointed at both ends, the lower furnished with a long, deciduous, white, silky coma; testa thin, striate; albumen very thin; cotyledons convolute, cordate, .25 in. long; radicle cylindric, .15 in. long. *Camararia dubia*, Sims Bot. Mag. t. 1646 (1814). *Strophanthus Jackianus*, Wall. Cat. 1643; A. DC. Prodr. VIII. 419; Miq. Fl. Ind. Bat. II. 442; Hook. f. Fl. Br. Ind. III. 655; Hook. Ic. Pl. t. 1521; Pax in Engl. Bot. Jahrb. XV. 380; Franchet in Nouv. Arch. Mus. Paris, 3, Sér. v. 260; Gilg in Engl. Monog. 12.

TRANG: in open jungle, on hilly ground at 200 to 300 ft., *Kunstler* 1400. JUNKSEYLON (Tongka): *Curtis*. PENANG: *Jack*; *Wallich* 1643; *Curtis* 188.

We consider that this species is rightly placed in this genus rather than in *Strophanthus*, on account of the structure of the seeds, but the stamens are much less exsert than is usual in *Wrightia*, and the corona-lobes are not cleft. There is in the Kew Herbarium an excellent drawing of a flowering and fruiting branch by Mrs. Hutton.

*Curtis's* No. 2915, from Junkseylon (Tongka), marked *Strophanthus* sp., an erect shrub 4 to 5 ft. high, with brick-red flowers, has exactly the flowers of *Wrightia dubia*, but the leaves are membranous, elliptic, short-acuminate at apex, cuneate at base, 7.5 in. long, and 2.75 in. broad. It cannot, however, be separated as a species, and may be called var. *membranifolia*, King & Gamble.

4. *WRIGHTIA RELIGIOSA*, Benth. in Gen. Pl. II. 713 (1876). A small shrub or tree; branches stiff, grey; branchlets also stiff, twiggy, innovations scabrous-papillose. *Leaves* membranous, small; ovate-lanceolate, obtusely acuminate at apex, cuneate at base, those of young shoots linear-oblong; glabrous on the upper surface except for the crisped pubescence on the midrib, glabrous on the lower, the midrib only slightly pubescent; .5 to 1.5 in. long, .3 to .7 in. broad, those of the shoots 2 to 2.5 in. long and .5 in. broad; midrib slender, crisped-pubescent; main nerves about 4 pairs (shoot-leaves up to 10 pairs or more), curved upwards to join in a faint intramarginal nerve; secondary nerves and reticulations inconspicuous; petiole slender, scarcely .1 in. long. *Cymes* terminal, few- (up to 12-) flowered; main peduncles fairly stout, flattened, .2 in. long; secondary peduncles 1 to 4, about .1 in. long; pedicels capillary, .5 to .7 in. long, curved and twisted; bracteoles minute, ovate; buds ovate-oblong; flowers white. *Calyx*-lobes ovate, acute, ciliate, with a few (about 5) blackish scales near the top of the tube inside. *Corolla*-tube cylindric, glabrous, .15 in. long; lobes ovate-orbicular, very thin, nervose, .25 to .3 in. long, glabrous; corona-scales none. *Stamens* long-exsert; filaments rather slender, .1 in. long; anthers linear-lanceolate, cells near the summit, connective thickened. *Ovary* ovoid, glabrous; style slender; stigma conical. *Follicles* straight, linear, terete, 3 to 6 in. long, divergent at an angle of about 20° to 40°. *Seeds* linear, .3 to .4 in. long, somewhat blunt at both ends, furnished below with a white silky coma 1 to 1.5 in. long; testa striate, faintly puberulous. Hook. f. Fl. Br. Ind. III. 653; Kurz For. Fl. II. 194. *Echites religiosa*, Teysm. & Binnend. Hort. Bogor. 126.

SIAMESE STATES: at Kasoom, Curtis 3241. MALACCA: *Maingay* (K.D.) 1071. SINGAPORE: *T. Anderson* 115; *Maingay* (K.D.) 3334; cultivated only.—DISTRIB. Siam (*Schomburgk* 132); Tenasserim.

#### Subtribe 2.—NERINEÆ.

#### 19. STROPHANTHUS, DC.

Small trees or shrubs; often climbing. *Leaves* opposite, pinniveined. *Flowers* usually large, in terminal cymes. *Calyx* 5-partite, scales 5 to many within at the base of the lobes. *Corolla* funnel-shaped; tube short, campanulate or urceolate at the mouth and furnished with 10 free or connate corona-scales\*; lobes 5, twisted, overlapping to the right, sometimes produced in long or short tails, rarely ovate-acute. *Stamens* inserted at the top of the tube, included; filaments short;

\* The corona-scales may be either considered as 10, free or connate; or as 5, often cleft to the base.

anthers sagittate, more or less acuminate or produced in a long bristle, connivent around the stigma and adhering to it; cells pollen-bearing near the top only, produced at the base in empty spurs. *Disk* none. *Carpels* 2, distinct; style slender; stigma thick, columnar or conical with a membranous reflexed frill at the base, tip simple or bifid; ovules many in each carpel, many-seriate. *Fruit* of two follicular mericarps, oblong or elongate, hard, divergent or divaricate. *Seeds* compressed, fusiform, narrowed into a long, feathery-plumose point, base with a deciduous coma; albumen scanty, fleshy; cotyledons oblong, plano-convex. — **DISTRIB.** Tropical and South Africa and Tropical Asia; about 40 species.

Lobes of the corolla exceeding the tube in length:—

Lobes of the corolla more than 1 in. long; main nerves of leaves conspicuous; corona-scales falcate-acuminate:—

Leaves 3 to 5 in. long; calyx-lobes acuminate from an ovate base, .25 in. long; bracts short .. .. 1. *S. dichotomus*.

Leaves 1.5 to 3 in. long; calyx-lobes subulate-lanceolate, .5 in. long; bracts long, similar to calyx-lobes .. .. 2. *S. Wallichii*.

Lobes of the corolla scarcely .75 in. long, blunt at tip; main nerves very obscure; corona-scales a short crenate fold .. .. 3. *S. perakensis*.

Lobes of the corolla almost as long as the tube; leaves 2 to 4 in. long; main nerves conspicuous; corona-scales linear-falcate; calyx-lobes ovate-acute, .1 in. long. .. .. 4. *S. singaporianus*.

1. **STROPHANTHUS DICHOTOMUS**, DC. in Bull. Soc. Philom. Paris III. 123 (1802). An erect or straggling sarmentose shrub, 9 to 10 ft. high; branches stout, as are the branchlets; bark of branchlets dark brown with prominent lenticels. *Leaves* chartaceous, often membranous when dry, elliptic, elliptic-oblong or -obovate, more or less abruptly shortly acuminate at apex, cuneate at base; both surfaces glabrous; margins recurved; 3 to 5 in. long, 2 to 3 in. broad; midrib prominent, impressed above, raised beneath; main nerves 8 to 9 pairs, impressed above, raised beneath, starting at an angle of about 70° with the midrib and slightly curved upwards to meet in a prominent intramarginal looped nerve at a little distance from the edge; secondary nerves few, between the main nerves; reticulations oblique, impressed above; petiole .25 in. long, articulate. *Cymes* dichotomous; peduncle short, stout, up to .5 in. long; branches short, corymbose, with ovate-acuminate, caducous bracts about .15 in. long; pedicels stout, .3 to .5 in. long; bracts small, ovate-acute; flowers whitish or greenish with dark purple corolla-tails. *Calyx* with very short tube; lobes glabrous, acuminate from an ovate base, .25 in. long, furnished within at the base with a pair of ovate-acute, entire or bifid scales. *Corolla*-tube slightly cylindric at first, then funnel-shaped, .75 in. long; lobes rounded at first, .5 in.

long, ending in very long, up to 4 in. or more, slender tails; corolla-scales alternate with the lobes, cleft nearly to the base, divisions linear-falcate on a broad base .2 to .25 in. long. *Anthers* pubescent on the back; tips produced in a very long, slender bristle; filaments broad, decurrent within the tube. *Ovary* glabrous; style stout, upper part rugose; stigma with a reflexed fringe. *Follicles* very large, divergent, about 8 in. long by 2 in. broad, broadest at the base where united, tapering to a broad rounded point. *Seeds* compressed, fusiform, .7 in. long, produced in a long beak, the upper part of which, about 1 in. long, is furnished with a brush-like coma of white silky hairs, 1 in. long or more; testa thin, dark brown; albumen very thin; cotyledons oblong, somewhat auricled at base, .4 in. long, .15 in. broad; radicle cylindric, .25 in. long. A. DC. Prodr. VIII. 417; Bl. Bijdr. 1044; Miq. Fl. Ind. Bat. II. 441; Hook. f. Fl. Br. Ind. III. 655. *S. Horsfieldianus*, Miq. l.c. 442. *S. scandens*, Roem. & Sch. Syst. IV. 412. *S. longicaudatus* and *S. Griffithii*, Wight Ic. t. 1299, 1300; Miq. l.c. 442. *S. caudatus*, Kurz in Journ. As. Soc. Beng. XLVI. 257 and For. Fl. II. 191; Pax in Engl. Bot. Jahrb. XV. 263; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 263; Gilg in Engl. Monog. 16. *S. pentaphyllus*, Griff. Notul. IV. 78. *Echites caudata*, Burm. Fl. Ind. 68, t. 26. *Nerium caudatum*, Lamk. Dict. III. 458.

PERAK: Wray 1668, 3306; *Scortechini* 1819, 1740; *King's Collector* 3896, 8628. MALACCA: *Griffith*; *Maingay* (K.D.) 1073; *Lobb*.—DISTRIB. Tenasserim, Java.

2. STROPHANTHUS WALLICHII, A. DC. Prodr. VIII. 418 (1844). A climbing glabrous shrub; branchlets slender, terete, bark brown with many prominent lenticels. *Leaves* membranous; elliptic-oblong or -obovate, abruptly and shortly acuminate at apex, cuneate to almost rounded at base, plicately folded when young; upper surface dull, dark, lower surface pale; margins undulate, recurved; 1.5 to 3 in. long, .75 to 1.25 in. broad; midrib prominent, flattened beneath, slightly impressed above; main nerves 7 to 8 pairs, at an angle of about 60° with the midrib, curving upwards to join in an intramarginal looped nerve well within the margin; secondary nerves and reticulations in an elegant network; all, with the main nerves and midrib, prominent on the under surface by their colour darker than that of the tissue; petiole slender, .25 in. long. *Cymes* dichotomous, spreading, reaching 3 in. long and 3 in. in breadth at the corymbose top; main peduncles .1 to 1.5 in. long; secondary peduncles about 4, up to 1 in. long; tertiary peduncles and pedicels slender, about .25 in. long; bracts or bracteoles at each joint in pairs similar to the calyx-lobes, linear-lanceolate, recurved, .25 to .35 in. long, minutely pubescent; flower-buds slender; flowers pink or yellow with

faint reddish stripes. *Calyx*-lobes subulate-lanceolate, .5 in. long, reflexed in flower, minutely pubescent; scales at base very minute, often wanting. *Corolla*-tube cylindric-funnel-shaped, as long as the calyx-lobes; lobes ovate acuminate, produced into slender tails reaching 2 to 3 in. long; corona-scales cleft to the base, each half falcate acuminate, about .15 to .2 in. long. *Anthers* very narrow, produced in long slender soft awns up to .5 in. long, the awns twisted together in the flower, connective on the back and lower part of awns minutely pubescent; filaments broad, decurrent half-way down the tube. *Ovary* glabrous, depressed; style slender, slightly pubescent. *Fruit* not known. Pax in Engl. Bot. Jahrb. XV. 378; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 268; Gilg in Engl. Monog. 16; Hook. f. Fl. Br. Ind. III. 655; Miq. Fl. Ind. Bat. II. 442; Prain Beng. Plants 677. *S. dichotomus*, Wall. Cat. 1641; Wight Ic. t. 599; Lodd. Bot. Cab. t. 759; Grah. in Maund Bot. III. t. 150. *S. caudatus*, Kurz For. Fl. II. 193. *Nerium caudatum*, Roxb. Fl. Ind. II. 9; Burm. Fl. Ind. t. 26.

JUNKSEYLOON ISLAND (Tongka): *Curtis* 2931. TRANG: *King's Collector* 1387 or 1397 (?).—DISTRIB. India (Circars, Khasia Hills, Chittagong and Tenasserim).

3. *STROPHANTHUS PERAKENSIS*, Scortechini MS. in Herb. Calc. A slender climber; branchlets slender, glabrous, lenticellate. *Leaves* thinly coriaceous when green, membranous when dry, glabrous; elliptic-oblong, acuminate at apex, acute at base; both surfaces somewhat pale, the lower paler; margins crispate, slightly recurved; 2 to 3.5 in. long, .75 to 1 in. broad; midrib thick, impressed above, prominently raised beneath; main nerves very obscure, 10 to 12 pairs, leaving the midrib at an angle of about 70° and nearly straight, joining near the margin in a very faint intramarginal looped nerve; reticulations not visible; petiole .25 in. long, channelled above and bordered by the decurrent margins of the blade. *Cymes* slender, few-flowered, about 1 in. long and 1 in. in diam., trichotomous; peduncle .25 to .5 in. long; secondary peduncles rather shorter, bearing 3 terminal flowers; pedicels slender, pubescent, about .1 in. long; bracts and bracteoles in pairs at all nodes, ovate and dark red at base, long acuminate, .15 to .2 in. long; buds slender, fusiform; flowers yellowish-green. *Calyx*-lobes ovate-lanceolate, acuminate, .2 in. long, the three inner with two minute obtuse scales at the base within. *Corolla*-tube urceolate, constricted at the mouth, as long as the calyx-lobes; lobes ovate-cordate at base, long acuminate with a blunt tip, .5 to .7 in. long; corona-scales cleft to the base, scarcely more than a short crenate fold. *Stamens* included; filaments short, decurrent half-way to the base of the tube and ending in an obtuse spur; anthers sagittate, the connective produced in a soft pubescent tip as long as the



anthers, pubescent on the back. *Ovary* ovoid, glabrous; style thick, rough; stigma cylindric with a short fringe below and a point at the apex. *Fruit* not seen.

PERAK: at Dipong, *Scortechini* 1818.

4. *STROPHANTHUS SINGAPORIANUS*, Gilg in Engl. Monog. 11 (1903). A straggling shrub; branchlets slender, brown, thickly covered with white lenticels. *Leaves* elliptic or elliptic-oblong, abruptly and shortly acuminate at apex, acute at base; dull on the upper surface and dark brown when dry, paler on the lower; margins crispately undulate, recurved; 2 to 4 in. long, 1.5 to 2 in. broad; midrib stout, impressed above, prominently raised beneath; main nerves 6 to 8 pairs, starting at an angle of about 70° and curving upwards to meet in an intramarginal deeply looped nerve; secondary nerves and reticulations well-marked beneath; petiole .25 to 4 in. long, bordered by the decurrent margins of the blade. *Cymes* dichotomous on a peduncle .25 to 1 in. long, reaching 2 in. in length and about 2 in. broad at the corymbose top; branch peduncles and pedicels rather stout, of varying length, pedicels greatly enlarged in fruit; bracts and bracteoles in pairs at all nodes, ovate-acute, about .15 in. long; buds clavate, flowers purple. *Calyx*-lobes ovate-acute, glabrous, .1 in. long, inner three furnished with 2 to 4 small glands at the base inside. *Corolla*-tube cylindric, sometimes a little constricted at the mouth, .25 in. long; lobes as long as tube, ovate-acute, campanulate; corona-scales linear-falcate, cleft to the base, .1 in. long. *Anthers* produced in slender soft filiform awns; filaments pubescent, flattened, decurrent about half-way down the corolla-tube. *Ovary* ovoid, glabrous; style pubescent. *Follicles* 8 in. long by .5 to .75 in. broad, base broad, middle slightly turgid, then tapering to a long hard curved point; divergent so as to lie in the same straight line; pericarp terete, smooth. *Seeds* oblong-lanceolate, .75 to 1 in. long, .1 in. broad, pointed above, produced below in a long feathery plumose point; the coma white, soft; testa pale-brown, puberulous. *S. brevicaudatus*, Wight Ic. t. 1302 (1850); Hook. f. Fl. Br. Ind. III. 656; Kurz For. Fl. III. 191 and Journ. As. Soc. Beng. XLVI. ii. 257; Pax in Engl. Bot. Jahrb. XV. 380; Franchet in Nouv. Arch. Mus. Paris, 3<sup>e</sup> sér. V. 259. *Cercocoma singaporiensis*, Wall. Cat. 1623; G. Don Gen. Hist. Dichl. Pl. IV. 83; A. DC. Prodr. VIII. 432; Miq. Fl. Ind. Bat. II. 445.

MALACCA: *Griffith*; *Maingay* (K.D.) 1072; *Derry* 528. SINGAPORE: *Wallich* 1623; *Lobb*; *Kurz*; *Ridley* 6040, 9149; *King's Collector* 1191.—  
DISTRIB. Mergui (?), Borneo (*Haviland* 1770, *Beccari* 797; *Motley*).

## Subtribe 3.—ECHITIDINÆ.

## 20. URCEOLA, Roxb.

Large climbing shrubs. *Leaves* opposite, penninerved. *Flowers* small, in dense corymbosely paniced cymes at the ends of the branchlets. *Calyx* 5-partite, without glands within; lobes oblong or linear. *Corolla* urceolate or subglobose; throat naked; lobes 5, short, valvate, subinduplicate. *Stamens* attached to the base of the corolla, included; filaments very short; anthers sagittate, scarcely acuminate, connivent around the stigma and adhering to it at their middle; cells produced at the base in empty spurs. *Disk* cupular or annular, truncate or shortly 5-lobed. *Ovary* of 2 distinct carpels, longer than the disk, many-ovuled; style short; stigma oblong-conic, subannulate at the base. *Fruit* of 2 spreading follicular mericarps, thick and acuminate or elongate, contracted or not between the seeds. *Seeds* oblong or linear, compressed, villous; tip contracted, bearded with long persistent brown hairs and crowned with a long white deciduous coma; albumen scanty; cotyledons flat, foliaceous; radicle short.—DISTRIB. Malay Peninsula and Archipelago; about 7 to 8 species.

Follicles straight, even, terete, slender, not constricted between the seeds:—

Follicles in one line or very slightly curved either way:—

Leaves rusty-pubescent beneath; calyx-lobes linear, .1 to .15 in. long, much recurved .. .. 1. *U. elastica*.

Leaves nearly or quite glabrous beneath:—

Leaves somewhat glaucous beneath; calyx-lobes broad obtuse, little recurved; corolla urceolate .. .. 2. *U. Maingayi*.

Leaves reddish-brown beneath; calyx-lobes ovate, very small, under .05 in. long; corolla globose .. .. 3. *U. brachysepala*.

Follicles recurved; leaves red-brown beneath when dry; calyx-lobes longer than corolla .. .. 4. *U. malaccensis*.

Follicles poniard-shaped, thickened in the lower part, long-pointed above; calyx-lobes very short; leaves red-brown when dry .. .. 5. *U. lucida*.

Follicles torulose, thickened opposite the seeds and constricted between them; leaves red-brown when dry .. .. 6. *U. torulosa*.

SPECIES IMPERFECTLY KNOWN: 7. *U. reticulata*. 8. *U. sp.*

1. URCEOLA ELASTICA, Roxb. in As. Res. V. 167 (1799) *with fig. (excl. fruit)*. A large climbing shrub; branches thick, with dark brown bark; branchlets slender, often flexuose, innovations pubescent. *Leaves* coriaceous, ovate or elliptic-ovate, abruptly acuminate at apex, rounded at base; upper surface glabrous except on the midrib and main nerves, lower rusty-pubescent, but reddish brown when dry; margin strongly

recurved, often with thicker pubescence beneath: 4 to 7 in. long, 2 to 3·5 in. broad; midrib stout, slightly impressed above; main nerves 10 to 12 pairs, strongly marked beneath, slightly impressed above, at an angle of about 60° with the midrib, straight at first and then curving and anastomosing near the margin; secondary nerves none; reticulations transverse, fairly regular; petiole ·5 to 1 in. long, rusty-pubescent, twisted at the base, the bases of each pair joined by a ridge at the node. *Inflorescence* finely rusty-pubescent, trichotomous, up to 12 in. long and 8 in. broad: main branch peduncles 2 to 2·5 in. long; secondary branch peduncles 1 to 1·5 in. long; cymules terminal, corymbose or subumbellate, many- and densely-flowered, ·05 to ·1 in. long; bracts leaf-like; bracteoles linear-subulate, ·1 to ·25 in. long; flowers very small. *Calyx*-tube short: lobes linear, ·1 to ·15 in. long, recurved. *Corolla* urceolate, tube ·05 in. long, glabrous within, except a tuft of reflexed hairs between the stamens; lobes oblong, a little longer than the tube. *Anthers* acuminate, pollen-cells at the top; filaments broad, short, minutely pubescent. *Ovary* globose, pubescent; style short; stigma conical. *Follicles* connected at the base, straight, horizontal or sometimes recurved, cylindric, acuminate, brown-velvety-pubescent when young, smooth and glabrous when old, about 6 in. long and ·3 in. broad. *Seeds* linear-oblong, ·5 in. long, flattened, surmounted by a ring of tawny bristles, from the centre of which arises a coma of white silky hairs 1·5 to 2 in. long; testa slightly tawny-villous; albumen very scanty; cotyledons oblong; radicle rather long. A. DC. Prod. VIII. 358; Wight Ic. t. 473 (*excl. figure and description of fruit*); Miq. Fl. Ind. Bat. II. 416; Hook f. Fl. Br. Ind. III. 656. *Tabernaemontana elastica*, Spreng. Syst. Veg. i. 639. ? *Vahea gummifera*, Poir Diet. Suppl. V. 409.

PENANG: Roxburgh (*Howison* and C. Campbell); Curtis 823; King's Collector 1749. PERAK: Wray 595, 1812, 2308, 2599, 4273; King's Collector 2241, 2447, 3597, 4239, 4886, 5061, 7567, 10348. SELANGOR: Goodenough 10600. MALACCA: Griffith; Maingay (K.D.) 1058, 1091; Cantley; Derry 404, 1024, 1031; Curtis 3477.—DISTRIB. Sumatra.

As noted by Hook. f. in Fl. Br. Ind., the fruit figured and described by Roxburgh, Wight, and A. DC. as that of *U. elastica* is that of *Orchipeda fatida*, Blume, a Javanese tree.

2. URCEOLA MAINGAYI, Hook. f. in Fl. Br. Ind. III. 658 (1882). A large climbing shrub; branchlets nearly black, terete, more or less rusty-pubescent as are the innovations. *Leaves* coriaceous; elliptic, abruptly acuminate at apex, narrowed or rounded at base; glabrous and shining greenish brown on the upper surface, pale and dull and more or less glaucous on the lower, glabrous or minutely pubescent; margins recurved, 2·5 to 5·5 in. long, 1·5 to 3 in. broad; midrib prominent,

dark, impressed on the upper surface; main nerves 8 to 10 pairs, prominent, starting at an angle of about  $70^{\circ}$  with the midrib and curving upward to anastomose near the margin; secondary nerves few, reticulations transverse, prominent, more or less raised above; petiole  $\cdot 4$  to  $\cdot 6$  in. long. *Inflorescence* minutely rusty-pubescent, trichotomous, up to 8 in. long and 5 in. broad; main branch peduncles 2 to 2.5 in. long; secondary rather shorter; cymules terminal, corymbose or subumbellate; pedicels slender,  $\cdot 1$  in. long; lower bracts leaf-like; bracteoles linear-subulate,  $\cdot 2$  in. long; flowers very small. *Calyx*-tube very short; lobes ovate oblong, little recurved, obtuse at tip,  $\cdot 125$  in. long. *Corolla* urceolate; tube very short, glabrous within; lobes oblong, rather longer than the tube. *Anthers* sagittate, obtuse at apex, the tails diverging. *Ovary* globose, pubescent; style obconical; stigma conical with a short bifid apiculus. *Follicles* connected at the base, diverging nearly horizontally, 6 to 8 in. long,  $\cdot 25$  in. broad, usually hooked at the tip; pericarp terete, dark brown, glabrous. *Seeds* linear-oblong, flattened,  $\cdot 6$  in. long, surmounted by a ring of tawny bristles and a coma of white silky hairs 1 in. long; testa softly tawny-villous; albumen very scanty; cotyledons oblong; radicle rather long.

PERAK: *King's Collector* 4743, 5134; *Wray* 2367 (young follicles curving inwards almost to a circle). MALACCA: *Hullett*. SINGAPORE: *Maingay* (K.D.) 1083; *Ridley* 2717.—DISTRIB. Borneo (*Haviland* 1527, 1767, 3497).

3. URCEOLA BRACHYSEPALA, Hook. f. in Fl. Br. Ind. III., 659 (1882). A climbing shrub; branchlets slender, dark brown, terete. *Leaves* chartaceous, perhaps coriaceous when green; elliptic, abruptly obtusely acuminate at apex, rounded at base; both surfaces smooth, red-brown when dry; margins slightly recurved; 4 to 5.5 in. long, 1.5 to 2.5 in. broad; midrib prominent, rather slender; main nerves 6 to 8 pairs, starting from the midrib at an angle of  $70^{\circ}$  to  $75^{\circ}$  and curved upwards to and along the margin only, the upper few meeting in an intra-marginal nerve, rest anastomosing, all prominent, raised on the upper surface as are the prominent transverse reticulations; petiole slender,  $\cdot 5$  to 1 in. long, articulate near the base. *Inflorescence* puberulous, trichotomous, terminal on main or side branchlets, up to about 6 in. long and 5 in. broad; main peduncle 1 to 2 in. long, terete; secondary peduncle also about 1 to 2 in. long, flattened as are further branches; cymules corymbose, pedicels slender, often recurved; bracts leafy; bracteoles subulate, reddish, numerous; buds globose; flowers minute. *Calyx*-lobes very small, ovate,  $\cdot 03$  to  $\cdot 04$  in. long, very slightly puberulous. *Corolla* globose, villous without, glabrous within, except for tufts of hair between the stamens, inflated,  $\cdot 075$  to  $\cdot 1$  in. long; lobes induplicate.

*Anthers* acute or very minutely apiculate; spurs slightly incurved. *Ovary* villous; style obconical; stigma conical, annulate at base. *Follicles* usually horizontal, in one line, sometimes slightly curved backwards, terete, 6 to 8 in. long, .2 in. broad, acuminate and slightly hooked at apex. *Seeds* flattened, .4 to .5 in. long, ending in a tuft of bristles and a milky-white coma about 1.5 in. long; testa tough, densely rusty-villous.

PENANG: *Curtis* 403. PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1079, 1080; *Curtis* 3478; *Goodenough* 1564; *Ridley* 1610, 2727, 6937, 8397, 9125, 10772.

4. URCEOLA MALACCENSIS, Hook. f. in Fl. Br. Ind. III. 658 (1882). A large climbing shrub, glabrous except the innovations and the inflorescence; branchlets nearly black, terete, rather slender. *Leaves* coriaceous ovate or ovate-oblong, obtusely caudate-acuminate at apex, rounded at base; upper surface pale green, pale when dry, lower red-brown when dry, both surfaces smooth; margins slightly recurved; 2 to 4.5 in. long, 1 to 2 in. broad; midrib strong, impressed above, raised beneath; main nerves 6 to 8 pairs, slender, prominently marked on both surfaces, starting at an angle of about 60° with the midrib and curved upwards to and along the margin, intramarginal nerve only near the tip; reticulations transverse, regular; petiole .5 to .75 in. long, slender, articulate near the base, the bases of each pair of leaves joined by a slender ridge at the node. *Inflorescence* of terminal or axillary cymes, hoary-pubescent, trichotomous, about 2 in. long and 3 in. broad; cymules many-flowered, congested, corymbose; peduncles about 1 to 1.25 in. long, flattened; secondary peduncles about 1 in. long, rest smaller; bracts leafy; bracteoles very many, linear-oblong, similar to the calyx-lobes; buds globose. *Calyx*-lobes linear-oblong or almost spatulate, unequal, recurved, up to .1 in. long. *Corolla*-tube very short; lobes oblong, induplicate, glabrous within except for a small tuft of hair between the stamens. *Anthers* obtuse, with a rounded apiculus; spurs straight. *Ovary*-carpels hirsute; style obconic; stigma conical, tip bifid. *Follicles* slender, terete, acuminate, 8 to 9 in. long, .2 in. broad, slightly curved, recurved so that the angle between them is about 240°. *Seeds* oblong-fusiform; acuminate at the base, the tip furnished with a ring of bristles enclosing the white, silky, about 2 in. long, coma; testa thin, villous, with golden-silky stiff hairs.

PERAK: *King's Collector* 4464; *Ridley* 9666. MALACCA: *Maingay* (K.D.) 1098, 1082, *part*. SELANGOR: *Curtis* 2395. JOHORE: *Ridley* 9158; *G. King*. SINGAPORE: *Hullett* 846, 909; *Cantley* 121.

5. URCEOLA LUCIDA, Benth. in Gen. Pl. ii., 716 (1876). A climbing shrub, glabrous except the inflorescence; branchlets slender, nearly black, terete. *Leaves* chartaceous; elliptic or elliptic-oblong, abruptly

acuminate at apex with a usually oblique acumen, rounded at base, shining on both surfaces, red-brown when dry; margins slightly recurved; 3 to 5 in. long, 1.25 to 2 in. broad; midrib strong, very prominent beneath, slightly impressed above; main nerves 8 to 12 pairs, slightly impressed above, very strong beneath, starting at an angle of nearly 60° with the midrib and curved upwards to and along the margin, where they meet to form almost an intramarginal looped nerve; reticulations transverse, regular; petiole slender, .5 to 1 in. long, often twisted. *Inflorescence* of large terminal and axillary trichotomous panicles of cymes, reaching in all 1 ft. in length and breadth; peduncles and branches slender, uppermost only pubescent; main peduncles 2 to 3 in. long, secondary 1 to 1.5 in. long, tertiary about .5 in. long; cymules corymbose; pedicels short; bracteoles ovate acuminate, very small; buds globose or ovoid. *Calyx*-tube short; lobes broadly oblong, recurved, .05 in. long. *Corolla* urceolate, .1 in. long, tube very short; lobes oblong, longer than the tube, pubescent without, glabrous within. *Anthers* obtuse at the apex. *Ovary* glabrous or slightly hairy at the tip; style short; stigma conical. *Follicles* 3 to 4 in. long, horizontal, rigid (like poniards), base contracted, tip acuminate, .4 to .5 in. broad at the broadest a little above the base; exocarp thick; endocarp crustaceous; placenta woody. *Seeds* linear-oblong, .3 to .5 in. long, flattened, ending in a tuft of tawny bristles, which encloses a white silky spreading coma about 1 in. long; testa crustaceous, rusty-silky-pubescent; cotyledons foliaceous, .3 in. long; radicle .25 in. long. Hook. f. Fl. Br. Ind. III. 658. *Charannesia lucida*, A. DC. Prod. VIII. 444. *Echites* ? *lucida*, Wall. Cat. 1670; G. Don Gen Hist. Dichl. Pl. IV. 75.

PENANG: Wallich 1670; Curtis 661, 941, 3569; King's Collector 1329. PERAK: Scortechini 17, King's Collector 4929. MALACCA: Derry 333, 978, 1158, 1169. SINGAPORE: Hullett 860; Ridley 2745, 5628, 6937.

6. URCEOLA TORULOSA, Hook. f. in Fl. Br. Ind. III. 659 (1882). A climbing shrub, glabrous except the inflorescence; branchlets rather slender, very dark brown, terete. *Leaves* thinly coriaceous; ovate-oblong or oblong-lanceolate, acuminate at apex, acute or rounded at base, smooth on both surfaces, red-brown when dry; margin slightly recurved; variable in size, usually 4 to 7 in. long, 1.5 to 2 in. broad, but on end branchlets sometimes as small as 1 to 1.5 in. long and .75 to 1 in. broad; midrib slender, impressed above; main nerves very slender, 6 to 10 pairs, at about 50° to 60° with the midrib, curved upwards to and along the margin, where they anastomose; reticulations transverse, not prominent; petiole about .5 in. long, articulate near the base. *Cymes* terminal on side branchlets as well as on main branchlets, 2 to 2.5 in. long, 2 in. broad, pubescent; peduncles 1 to 2 in. long; branch peduncles short;

pedicels slender; bracteoles linear-subulate or lanceolate; buds globose; flowers very small. *Calyx*-lobes ovate-oblong, .05 to .075 in. long, obtuse, erect. *Corolla* urceolate; tube very short; lobes oblong acute, slightly longer than calyx-lobes, glabrous within except for tufts of hair between the anthers. *Anthers* .075 in. long, tip acute or bifid, spurs short, straight. *Ovary* villous; style obconic, subannulate at the base; stigma conical. *Follicles* torulose, very slender, 1.5 to 2.5 ft. long, smooth, the swellings 1 to 1.5 in. apart; pericarp thin, smooth inside; placenta enlarged opposite the seeds. *Seeds* elliptic-lanceolate, .5 in. long, the top crowned with a dense tuft of tawny bristles, within which arises the white silky coma 1 to 1.8 in. long; testa rather thick, ribbed, densely villous, with tawny hairs.

MALACCA: *Griffith*; *Maingay* (K.D.) 1080, 1086; *Derry* 1096. JOHORE: *Ridley* 11132. SINGAPORE: *Ridley* 152, 2722, 3602, 4433, 4960, 6523; ? *Kunstler* 198; *Hullett* 509.

## DOUBTFUL SPECIES.

7. URCEOLA RETICULATA, King & Gamble, n. sp. A climbing shrub; branchlets nearly black, smooth, slightly angled; all parts glabrous except the inflorescence and extreme innovations. *Leaves* elliptic; abruptly caudate-acuminate at apex, rounded or slightly cordate at base, shining on the upper surface, often plicate; margin recurved; 3.5 to 6 in. long, 2 to 3 in. broad; midrib strong, prominent beneath, slightly impressed above; main nerves 10 to 12 pairs, impressed above, prominent beneath, at an angle of 70° with the midrib, at first straight, then curved to meet in a conspicuously looped intramarginal nerve; secondary nerves few, short; reticulations transverse, very prominent, especially beneath; petiole .5 to nearly 1 in. long, slender, articulate near the base. *Inflorescence* terminal or axillary, tawny-puberulous, trichotomous, very much 5- to 6-pinnately paniculate, reaching 12 in. in length and nearly the same in breadth, but in some cases and especially when axillary very much smaller; peduncles and their branches variable in length, but always long, slender, flattened; ultimate cymules, sub-umbellately corymbose; bracts leafy, gradually diminishing; bracteoles small, ovate-lanceolate to ovate; buds globose, minute. *Calyx*-tube short; lobes as long as tube, .03 in. long, ovate, acute. *Corolla* globose; tube scarcely any; lobes ovate .06 in. long, glabrous within except for the tufts of hair between the stamens. *Anthers* sagittate; tip flattened, membranous; spurs as long as the upper part; filaments very short. *Ovary* villous, style obconical; stigma conical, bilobed. *Fruit* not known.

MALACCA: *Pun Bebas* 122. SINGAPORE: *Ridley* 2745, 5628.

8. URCEOLA ? branches and leaves glabrous; bark black when dry;

leaves 2 to 2·5 in. long by ·75 to 1·25 in. broad, elliptic- or ovate-lanceolate, obtusely acuminate, narrowed into the petiole, firmly coriaceous; pale brown, shining above; nerves 3 to 4 pairs, very slender, ascending; follicles horizontal, 6 to 8 in. long by ·25 in. broad, slightly curved, cylindric from the base, narrowed at the apex, hard; seeds ·3 to ·35 in. long, very slender, narrowed into a filiform process longer than the body, on which the fine pale brown hairs of the coma are placed. Hook f. Fl. Br. Ind. III. 659.

MALACCA: *Maingay* (K.D.) 1069.

We can do nothing to throw any further light on this remarkable plant. The structure of the seeds resembles that of those of *Kickxia*, but otherwise the plant is quite unlike that genus.

## 21. PARAMERIA, Benth.

Large climbing shrubs. *Leaves* opposite, rarely 3-nately whorled. *Flowers* small, in broad lax terminal or axillary panicles. *Calyx* small, 5-fid or 5-partite, with many glands at the base within. *Corolla* hypocrateriform or subcampanulate; tube short, broad at the mouth, naked; lobes 5, oblique, twisted, overlapping to the left. *Stamens* inserted at the base of the corolla, included; filaments short; anthers lanceolate-sagittate, acute or apiculate, conniving over and adhering to the stigma; cells spurred at the base. *Disk* of 5 connate scales. *Ovary* of 2 distinct carpels, longer than the disk, many-ovuled; style short, top obconical; stigma conical, with a minute nearly entire apiculus. *Fruit* of 2 long, slender, distantly torulose, follicular mericarps. *Seeds* linear or oblong, compressed, slightly or not contracted at the apex, crowned with short persistent bristles and a long deciduous coma; testa hairy; albumen scanty; cotyledons oblong, leafy; radicle short or long. — **DISTRIB.** India and Malaya, about 4 to 5 species.

Leaves under 6 in. long; inflorescence in loose paniculate cymes.

Leaves few- (5 to 7 pairs) nerved; inflorescence nearly glabrous; follicles 6 to 12 in. long; swellings opposite the seeds short; seeds under ·5 in. long, pubescent .. 1. *P. glandulifera*.

Leaves many- (8 to 10 pairs) nerved; inflorescence very tawny-pubescent; follicles 20 to 24 in. long; swellings opposite the seeds elongate; seeds 1 in. long, glabrous or slightly pubescent .. .. 2. *P. polyneura*.

Leaves over 6 in. long; inflorescence in dense paniculate cymes; follicles 11 to 14 in. long; swellings opposite the seeds short; seeds ·4 in. long, glabrous .. .. 3. *P. densiflora*.

1. **PARAMERIA GLANDULIFERA**, Benth. in Gen. Pl. II. 715 (1876). A large climbing shrub; branchlets stout or slender, brown, smooth. *Leaves* chartaceous, opposite or sometimes 3-nately whorled, elliptic, oblong or obovate, abruptly acuminate at apex, widely cuneate at base;



glabrous and shining on the upper surface, somewhat paler on the lower, glabrous except for tufts in the axils of the main nerves, not always found; margins slightly recurved; 3 to 5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above, raised beneath; main nerves 5 to 7 pairs, arched upwards to and along the margin, where they anastomose, rather indistinct, as are the secondary nerves and reticulations; petiole short, .1 to .2 in. long, stout. *Cyme*-panicles terminal or axillary to the upper leaves, trichotomous, glabrous or slightly puberulous; branches spreading, slender; terminal cymules subumbellately corymbose; bracts leafy; bracteoles very small, ovate-acute; buds oblong, clavate; flowers white, fragrant. *Calyx*-lobes ovate, ciliate, puberulous outside, .05 in. long, with minute, inconspicuous, subulate glands at the base inside. *Corolla* campanulate; tube .125 in. long, puberulous without; lobes rather longer than the tube, rotate, twisted to the right, obtuse. *Anthers* very small, apiculate, the spurs long; filaments short, with a broad base. *Ovary* minutely hairy; style obconical. *Follicles* very slender, flexuous, 6 to 12 in. long, glabrous, acuminate, diverging at up to 60° and then curving to run parallel to each other; swellings from .75 to 1.25 in. apart, short; pericarp thin, smooth; placenta enlarged opposite the seeds. *Seeds* oblong, concave on the ventral surface, .4 to .5 in. long, ending in a tuft of brown bristles, and a silky coma about 1 in. long; testa pubescent, thin; albumen scanty; cotyledons ovate, .15 in. long, very thin, foliaceous; radicle .125 in. long, slender, cylindric. Kurz in Journ. As. Soc. Beng. XLVI. ii. 255 and For. Fl. II. 660; Hook. f. Fl. Br. Ind. III. 660. *Ecdysanthera glandulifera*, A. DC. Prodr. VIII. 443; Wight Ic. t. 1307 (*E. Griffithii* in text); Miq. Fl. Ind. Bat. II. 432. *E. barbata*, Miq. l.c. 431. *Echites ? glandulifera* and *monilifera*, Wall. Cat. 1659, 1660; G. Don Gen. Hist. Diehl. Pl. IV. 75. *Parsonsia barbata*, Bl. Bijl. 1042.

PENANG: Curtis 1142. MALACCA: Griffith; Maingay (K.D.) 1077, 1093; Cantley; Derry 920, 943. SINGAPORE: Wallich 1660; Lobb.—DISTRIB. Burma, Andaman Islands, Java, Borneo (Haviland 1993, 2056, &c.; Motley 776), Philippines, Cambodia.

2. *PARAMERIA POLYNEURA*, Hook. f. in Fl. Br. Ind. III. 660 (1882). A slender climbing shrub, glabrous except the inflorescence and innovations; branches stout, with dark-brown, rough, lenticellate, horizontally ridged bark; branchlets slender, minutely tawny puberulous. *Leaves* membranous; elliptic or elliptic-oblong or -obovate, abruptly short-acuminate at apex, narrowed and at length rounded at base; dark brown and shining above, paler beneath, and very red-brown and reticulate when dry, punctulate; margins slightly recurved; 3 to 6 in. long, 1.25 to 2.5 in. broad; midrib prominent on the lower, impressed

on the upper surface; main nerves 8 to 10 pairs, the lowest pair very near the edge, starting at an angle of about  $65^\circ$  with the midrib, curving upwards to and along the margin, where they anastomose, raised beneath, as are the numerous secondary nerves and the prominent transverse reticulations; main nerves usually with a tuft of hair in their axils; petiole .1 to .2 in. long, articulate near the base. *Inflorescence* paniculate, terminal, sessile, trichotomous, 4- to 5-pinnate, tawny-puberulous, usually about 6 in. long and 6 to 8 in. broad; primary branches 1.5 to 2.5 in. long, flattened; subsequent branches gradually shorter; pedicels short, .1 in. long, slender; cymules corymbose; bracts leafy; bracteoles very minute, ovate; buds shortly clavate; flowers white, with a pink throat. *Calyx*-tube short; lobes ovate, acute, ciliate, about .04 in. long; glandular scales minute, generally subulate. *Corolla*-tube campanulate, contracted at the base, .1 in. long, glabrous within, sparsely pubescent without; lobes ovate-oblique, twisted to the right, rotate in flower, as long as tube. *Anthers* very small, with a triangular membranous tip. *Disk* faintly 5-lobed. *Ovary* villous; style obconical; stigma conoidal. *Follicles* slender, straight, 20 to 24 in. long, glabrous, acuminate, diverging at  $60^\circ$  to  $90^\circ$  and then slightly curving to lie parallel; the swellings opposite the seeds elongate, 1 in. long and about 2 in. apart from centre to centre; pericarp thin, smooth; placenta enlarged opposite the seeds which embrace it. *Seeds* fusiform, 1 to 1.25 in. long, concave on the ventral surface, ending in a somewhat dilated cup-shaped tip, which bears a silky white coma up to 2 in. long; testa thin, minutely pubescent; albumen scanty; cotyledons oblong, .2 in. long; radicle cylindric, as long as cotyledons.

PENANG: *Curtis* 1455, 3025. PERAK: *Wray* 2308, 3459; *Scortechini* 58, 1838; *King's Collector* 3337, 3640, 5687, 7491. MALACCA: *Griffith*; *Maingay* (K.D.) 1078; *Hervey*; *Derry* 1013, 1206; *Goodenough* 1241; *Ridley* 10790. SINGAPORE: *Ridley* 2713, 2721; *Cantley* 140; *Hullett* 849.—DISTRIB. Tenasserim (*Lobb*); Borneo (*Haviland* 1598, 1796; *Fraser* 255); Sumatra (*Forbes* 2951).

3. *PARAMERIA DENSIFLORA*, Oliv. in Hook. Ic. Pl. t. 1520 (1886). A shrub; branchlets stout, about .25 in. in diameter, fistular, densely rusty-tomentose. *Leaves* chartaceous; obovate, oblong or oblanceolate, abruptly acuminate at apex, cuneate and at last rounded at base, glabrous and shining on the upper surface, sparsely pilose on the lower surface, especially on the nerves; margins recurved; 5 to 8 in. long, 1.75 to 2.5 in. broad; midrib stout; main nerves 6 to 8 pairs, at an angle of about  $30^\circ$  with the midrib; at first nearly straight, then curving upwards to anastomose near the margin, impressed above; secondary nerves short; reticulations transverse, distant, not promi-

ment; petiole stout, channelled, about .2 in. long. *Inflorescence* terminal, or axillary to the upper leaves, rusty-pubescent, densely corymbosely paniculate, sessile, reaching 6 in. in length, and about 4 to 5 in. in breadth; main peduncles 1 to 1.5 in. long, flattened, stout; branches opposite or verticillate, also flattened, as are the minor and much shorter branches; pedicels slender, about .15 in. long; bracts leafy; bracteoles small, ovate, acute; buds broadly clavate. *Calyx* very small; lobes ovate, acute, pubescent without, glabrous within, .03 in. long; scales 3 to 5 to each lobe, obscure. *Corolla* funnel-shaped; tube rather slender, minutely pubescent without, .15 in. long; lobes ovate-oblique, twisted to the right, glabrous. *Anthers* apiculate; filaments very short. *Ovary* almost glabrous; style short, obconic; stigma conical. *Follicles* slender, 11 to 14 in. long, nearly at right angles and curved inwards, distantly torulose, the spaces 1 to 1.25 in. long; the swellings ellipsoid, .5 in. long; interspaces less near the tip; pericarp brown, minutely rusty-puberulous at first, afterwards glabrescent. *Seeds* 10 to 12, .4 in. long, oblong, curved, obtuse at the tip, glabrous, dark reddish brown, the tip with a tuft of tawny bristles surrounding a white silky coma 1 in. long; integuments 2, the outer hard.

PENANG: on Government Hill, *Curtis* 158; *Hullett* 159.

## 22. ECDYSANTHERA, Hook. & Arn.

Glabrous climbing shrubs. *Leaves* opposite, acuminate with distant main nerves. *Flowers* small, white or pink, in terminal or axillary lax trichotomous paniculate cymes. *Calyx* small, deeply 5-fid, with few or no glandular scales at the base within. *Corolla* suburceolate, the throat naked; lobes 5, very short, obtuse, overlapping to the right, hardly twisted. *Stamens* inserted at the base of the corolla-tube, included; filaments short; anthers sagittate, conniving over and adhering to the stigma; cells produced at the base in empty spurs. *Disk* annular. *Ovary* of 2 distinct carpels, longer than the disk; style short; stigma obpyriform; ovules many. *Fruit* of 2 divaricate, terete, acuminate follicular mericarps. *Seeds* few, oblong or linear, compressed, little contracted at the apex and crowned by a persistent ring of short hairs and a long deciduous coma; albumen scanty; cotyledons oblong or ovate, leafy; radicle short.—DISTRIB. India, Malaya and Southern China; about 4 or 5 species.

Cymes terminal, branches rather stout; leaves with main nerves very oblique (45°) to the midrib .. ..	1. <i>E. micrantha</i> .
Cymes lateral, branches slender; leaves with main nerves at about 60° with the midrib .. ..	2. <i>E. multiflora</i> .

1. *ECDYSANTHERA MICRANTHA*, A. DC. Prodr. VIII. 442 (1844). A large climbing shrub; branches slender, pendulous, lenticellate; branchlets brown, terete, lenticellate; innovations sometimes puberulous. *Leaves* membranous; ovate-lanceolate to oblong-lanceolate, obtusely acuminate at apex, acute or cuneate at base; glabrous on both surfaces, often reddish-brown when dry; 2 to 7 in. long, 1 to 2 in. broad; midrib slender; main nerves 3 to 5 pairs, at about  $45^\circ$  with the midrib, curved upwards to and along the margin and prominently connected by the transverse reticulations, often with a small tuft of hairs in the axils beneath; petiole .3 to .5 in. long, somewhat twisted. *Cymes* puberulous, trichotomous, reaching about 5 in. in length and breadth; main peduncles stout, variable; branch peduncles spreading, 1 to 2 in. long; cymules corymbose, many-flowered; pedicels slender, short, about .1 in. long; bracts linear, caducous; bracteoles very small, ovate-acute; buds ovoid. *Calyx* very small; lobes ovate, acute, pubescent, ciliate. *Corolla* urceolate, glabrous, very small (.05 in. long); lobes falcate, spreading. *Anthers* obtuse, sometimes with a small apiculus. *Ovary* puberulous, twice as long as the disk. *Follicles* 3 to 4 in. long, .75 in. broad near the base, horizontal, slightly recurved, narrowed from above the base to the point; exocarp fleshy, punctate; endocarp shining, crustaceous. *Seeds* elliptic-lanceolate, .75 in. long, .25 in. broad, compressed, narrowed above and bearing a ring of short tawny bristles and ending in a white silky coma 1.5 to 2.5 in. long; testa rusty-pubescent, thin; cotyledons oblong, leafy, about .3 in. long; radicle cylindric, about .15 in. long. Hook. f. Fl. Br. Ind. III. 662; Miq. Fl. Ind. Bat. II. 451. *E. brachiata*, A. DC. l.c. 443; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 189; Miq. l. c. 452. *Echites? micrantha* and *brachiata*, Wall. Cat. 1667, 1668; G. Don Gen. Hist. Dichl. Pl. IV. 75.

PERAK: *Scortechini*.—DISTRIB. India (Sikkim, Assam, Khasia Hills and Cachar), Burma.

The only specimen available is rather a poor one, but we see no reason to doubt its identity. The description of the fruit and seeds is taken from Indian specimens.

2. *ECDYSANTHERA MULTIFLORA*, King & Gamble, n. sp. A large climbing shrub; branchlets pendulous, terete, prominently lenticellate; innovations slightly puberulous. *Leaves* membranous, ovate or ovate-lanceolate, long acuminate often abruptly and obtusely at apex the acumen oblique, attenuate and almost rounded at base; glabrous on both surfaces; margins slightly recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, impressed above, raised beneath; main nerves 4 to 5 pairs, the lowest close to the margin, all at about  $60^\circ$  with the midrib and curving upwards to and along the margin and connected by

the parallel transverse reticulations, often with minute tufts of hair in the axils beneath; petiole .4 to .6 in. long, slender, articulate. *Cymes* lateral, trichotomous, rusty-puberulous. very many-flowered, reaching 6 in. or even more in length and breadth; main peduncles 1 to 2.5 in. long, slender; branches many, slender, gradually lessening; ultimate cymules corymbose; pedicels filiform, .1 to .2 in. long; bracts none or very caducous; bracteoles minute, ovate-acuminate; buds oblong. *Calyx*-lobes ovate acute, with minute glands at the base within, pubescent without. *Corolla* urceolate, .06 in. long; lobes short, very slightly twisted to the left. *Anthers* acuminate, basal spurs rather long. *Fruit* not seen.

PERAK: on Larút Peak at 2000 to 3000 ft., *King's Collector* 2294, 2401.

### 23. CHONEMORPHA, G. Don.

Stout woody climbing shrubs. *Leaves* opposite, broad, with arching pinnate nerves. *Flowers* large, white, in lax terminal and pseudo-axillary, bracteolate, paniculate cymes. *Calyx* tubular, 5-fid or -partite, with a ring of glands at the base inside. *Corolla* hypocrateriform; tube cylindric, but slightly expanded both at base and apex, without scales; lobes 5, broad, overlapping to the right, twisted sharply to the left. *Stamens* 5, included, inserted on the throat of the corolla; filaments very short, broad, villous; anthers sagittate, acuminate, connivent over and adhering to the stigma, their cells shortly spurred at the base. *Disk* thick, annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels; ovules many; style filiform, cleft at the base; stigma conoid or sub-clavate. *Fruit* of 2 long, straight, woody, parallel, triquetrous follicular mericarps. *Seeds* ovoid or oblong, flat, produced in a beak, which is again surmounted by a long silky coma; albumen thin; cotyledons flat, thick, oblong; radicle short.—DISTRIB. India and Malaya; 2 to 3 species.

CHONEMORPHA MACROPHYLLA, G. Don Gen. Hist. Dichl. Pl. IV. 76 (1838). A large climbing shrub with copious milky juice; branches stout, warty; branchlets stout, soft, fistular, pubescent, becoming glabrous in age. *Leaves* coriaceous; broadly elliptic to elliptic-obovate or suborbicular, blunt, notched or shortly abruptly acuminate at apex, rounded or cordate at base; both surfaces glabrous or glabrescent when old, the lower pubescent, hirsute or tomentose when young; margins slightly recurved; 6 to 10 in. long, 3.5 to 6 in. broad; midrib very stout, impressed above, prominently raised beneath; main nerves spreading, 8 to 10 or sometimes 12 pairs, at variable distances and irregular and often branched, prominently raised beneath; secondary nerves many,

joining the irregular transverse reticulations, all much raised beneath; petiole stout, .5 to 1.5 in. long. *Panicles* up to 10 in. long and 8 in. broad, pubescent; peduncles stout, 3 to 4 in. long; branches also stout, angled or flattened, more or less racemose; bracteoles ovate, acute, persistent; pedicels about .3 to .4 in. long, usually shorter than the calyces; buds clavate, the tip acute; flowers white. *Calyx* tubular, wider than the corolla-tube and less than half its length; the mouth with 5 short rounded or subacute teeth. *Corolla* 3 in. or more across; tube .75 to 1 in. long, villous within in 5 bands between the stamens; lobes spreading, obovate-cuneate. *Anthers* .5 in. long. *Follicles* 12 to 18 in. long, straight, boldly 3-angled, the tips incurved, .75 to 1 in. broad; pericarp woody. *Seeds* about 1 in. long, ovate below, narrowed half-way up into a beak and again expanded to receive the coma, which is softly white silky and 2.5 in. long; albumen very thin; cotyledons ovate-oblong, thick, .5 in. long; radicle cylindric, slender, .25 in. long. A. DC. Prodr. VIII. 430; Wight Ic. t. 432; Brandis For. Fl. 328; Kurz in Journ. As. Soc. Beng. XLVI. ii. 257, and For. Fl. II. 187; Miq. Fl. Ind. Bat. II. 444; Hook. f. Fl. Br. Ind. III. 661; Trimen Fl. Ceyl. III. 138; Cooke Bomb. Fl. II. 139; Prain Beng. Plants 678. *C. mollis*, Miq. l.c. *Echites macrophylla*, Roxb. Fl. Ind. II. 13; Wall. Cat. 1657. *E. grandis*, Wall. Cat. 1658; Dalz. & Gibs. Bomb. Fl. 147, "*Belutta-kaka-kodi*," Rheede Hort. Mal. IX. tt. 5, 6.

PENANG: *Ridley* 3441; *Curtis* 832. PERAK: *Wray* 2183, 2685, 3661; *Scortechini* 921; *King's Collector* 3636, 6000, 7304, 10574. MALACCA: *Maingay* (K.D.) 1074; *Derry* 543.—DISTRIB. India, Ceylon, Malay Archipelago.

#### 24. RHYNCHODIA, Benth.

Large climbing shrubs. *Leaves* opposite, membranous, broad, penninerved. *Flowers* in lax, broad, axillary or subterminal, paniculate cymes. *Calyx* 5-partite or -fid; lobes about as long as tube; glandular scales many. *Corolla* hypocrateriform; tube enlarged opposite the stamens, contracted at the throat, villous; lobes large, twisted, obliquely obcuneate or obovate-falcate, twisted to the left, overlapping to the right. *Stamens* inserted on the middle of the tube; filaments broad, short; anthers sagittate, conniving round and adhering to the stigma; cells with narrow incurved spurs. *Disk* annular, 5-fid. *Ovary* of 2 distinct carpels, longer than the disk; style slender, with an ovate truncate top; stigma columnar. *Fruit* of 2 narrow parallel compressed follicular mericarps. *Seeds* ovate or oblong, compressed, produced in a slender beak which is crowned by a deciduous coma;

albumen none; cotyledons oblong; radicle short, superior.—DISTRIB. One species, from India to China.

*RHYNCHODIA WALLICHII*, Benth. in Gen. Pl. II. 720 (1876). A large climbing shrub; branches distantly tubercled; branchlets glaucescent, rough, lenticellate, the scars of fallen leaves prominent. *Leaves* membranous; elliptic-ovate or -oblong, cuspidately or caudately acuminate at apex, cuneate sometimes unequally at base or occasionally rounded or even cordate; glabrous and shining above, glabrous or puberulous beneath; 5 to 9 in. long, 2 to 4 in. broad; midrib slender, raised beneath; main nerves 7 to 10 pairs, starting at an angle of about 50° with the midrib and curving upwards to and along the margin, where they anastomose to form a looped intramarginal nerve, raised beneath as are the few secondary nerves and the rather prominent transverse reticulations; petiole .75 to 1 in. long, slender, grooved, with small auricle-like stipular glands at the base. *Cymes* lax, axillary or subterminal, di-tri-chotomous, puberulous, reaching 5 in. long and about 7 in. in breadth; peduncles 1 to 3 in. long, slender, angled, puberulous or glabrous; branches long, slender, ultimate cymules subumbellate; pedicels .3 to .5 in. long; bracts oblong-lanceolate, ciliate, caducous; bracteoles at the bases of the pedicels, ovate-lanceolate, scarious, .1 in. long; buds clavate with conical tip; flowers white tinged with pink. *Calyx* campanulate; tube .1 to .15 in. long, furnished with many broad bifid scales at the base within; lobes linear-oblong, ciliate, obtuse, as long as the tube, margins reflexed. *Corolla*-tube broadly inflated opposite the stamens, 5-angled, .25 in. long, villous within, the throat narrowed; lobes obovate-falcate, about .5 in. long, slightly villous on the inner face. *Anthers* .15 in. long; spurs very slender. *Follicles* 12 to 18 in. long, pendulous. *Seeds* ovate-oblong; body .5 in. long; beak very slender, as long as body, crowned by a white silky coma 1.5 in. long; testa leathery, keeled on one side; cotyledons fleshy, flattened, .3 in. long, .1 to .15 in. broad; radicle thick, cylindric. Hook. f. Fl. Br. Ind. III. 667. *Rhyncospermum Wallichii* and *R. ellipticum*, A. DC. Prodr. VIII. 431. *Echites rhyncosperma*, Wall. Pl. As. Rar. I. 43, t. 49; Cat. 1665. *E. elliptica*, Wall. Cat. 1666. *E. verticalis*, Herb. Ham. *Cercocoma Wallichii*, Miq. Fl. Ind. Bat. II. 445; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 187.

KEDAH: on Langkawi Island, Curtis 3203. PERAK: *Scortechini* 1774; *King's Collector* 5635, 8790.—DISTRIB. India (Sikkim Himalaya, Assam), Burma, Tonkin.

## 25. ANODENDRON, A. DC.

Large glabrous climbing shrubs. *Leaves* opposite, with distant

nerves. *Flowers* in axillary or terminal trichotomous leafy paniculate cymes. *Calyx* small, 5-partite, glandular or not within. *Corolla* hypocrateriform; the tube cylindric, little dilated opposite the stamens; the mouth contracted, without scales; lobes narrow, overlapping to the right, twisted to the left, conical and spirally striate in bud. *Stamens* inserted below the middle of the tube; filaments very short; anthers sagittate, connivent round and adhering to the stigma; the cells shortly spurred at the base. *Disk* annular or cupular, entire or undulate. *Ovary* of 2 distinct carpels sunk in the disk and attached to it by their backs at the base, many-ovuled; style very short; stigma thick, conical, bi-lobed. *Fruit* of 2 divaricate acuminate follicular mericarps. *Seeds* few, ovoid or oblong, compressed, beaked, tipped with a long coma which extends down the upper part of the beak more or less; albumen usually copious; cotyledons ovate, subcordate, flat; radicle superior.—DISTRIB. India and Malaya; about 7 species.

Flowers in many-branched, many-flowered, cymes, usually 6-in. long or more; buds under .25 in. long; leaves coriaceous, more than 4 in. long and 1.5 in. broad, with prominent nerves:—

Main nerves 12 to 15 pairs, about .5 in. apart; corolla-lobes villous within and at the throat, over .1 in. long; follicles with thick pericarp; seeds obovoid, beak .25 in. long, the coma shortly decurrent only .. .. . 1. *A. paniculatum*.

Main nerves 8 to 10 pairs, about .75 to 1 in. apart; corolla-lobes nearly glabrous within and at the throat, .05 in. long; follicles with thin pericarp; seeds oblong, beak 1 in. long, the coma decurrent on the upper half .. .. . 2. *A. Candolleum*.

Flowers in few-branched, few-flowered, generally axillary cymes, usually under 1 in. long; buds at least .5 in. long; leaves chartaceous, usually under 4 in. long and 1.5 in. broad, with slender nerves; follicles with thin pericarp; the seeds obovoid, the beak over 1 in. long, coma decurrent on the upper half, very long .. .. . 3. *A. pauciflorum*.

Flowers in branched, corymbose, terminal cymes reaching 3 in. in length; buds .4 to .5 in. long; leaves coriaceous, under 3.5 in. long and 1.75 in. broad, with nerves nearly at right angles to the midrib .. .. . 4. *A. Wrayi*.

Flowers in axillary, panicle, branched cymes reaching 2.5 in. in length; buds .225 in. long; leaves coriaceous, oblong-lanceolate, reaching 3.5 to 5.5 in. long and 1 to 1.5 in. broad, with nerves at about 75° with the midrib .. .. . 5. *A. lanceolatum*.

1. *ANODENDRON PANICULATUM*, A. DC. Prodr. VIII. 444 (1844). A very large climbing shrub with greyish-brown bark; branchlets stout, rather fleshy, dark brown, glabrous, terete. *Leaves* thinly coriaceous; ovate, elliptic or elliptic-oblong, shortly and abruptly acuminate at apex,



cuneate and rounded at base; both surfaces glabrous; margins slightly recurved; 4 to 8 in. long, 1.5 to 3 in. broad; midrib stout, impressed and keeled above, raised beneath; main nerves 12 to 15 pairs, parallel, .4 to .6 in. apart along the midrib, starting at an angle of from 60° to 70° with the midrib and arching upwards to and along the margin where they anastomose; secondary nerves few, short, between the main nerves; reticulations transverse, conspicuous only in young leaves when dry; petiole .5 in. long, stout, slightly winged. *Cymes* axillary and terminal, repeatedly trichotomously branched, reaching about 10 in. in length and 6 in. in breadth, glabrous; peduncles slender, angled, .5 to 1 in. long; successive branchings similar but shorter; ultimate cymules 3-flowered; bracts similar to the leaves and gradually smaller; bracteoles ovate acute, in pairs at the bases of the upper cyme-branches and of the pedicels, which are about .05 to .1 in. long; buds conical, striated spirally by the twisted lobes of the corolla; flowers white or pale yellow. *Calyx*-lobes ovate, rounded, ciliate, the margins somewhat scarious, .06 in. long; scales none or very minute. *Corolla*-tube cylindric, dilated opposite the stamens and then contracted at the throat, .06 in. long; lobes oblong falcate, villous within and at the throat, .1 to .125 in. long, twisted sharply to the left. *Anthers* sagittate, acuminate, .04 in. long; spurs short. *Disk* cupular, entire, undulate, nearly enclosing the adherent glabrous carpels. *Style* almost none; stigma conical with an annular base. *Follicles* hard, woody, divergent in one line, 3 to 6 in. long, .5 to .75 in. broad near the base and thence narrowed to the blunt tip. *Seeds* few, obovoid, flattened, .5 to 1 in. long; beak .25 in. long, slender, slightly broadened at the tip, and bearing a 2 in. long white-silky spreading coma which extends a short way down the tip; testa dark brown, thin; albumen copious; cotyledons oblong, rounded, .4 in. long by .25 in. broad, prominently nerved; radicle cylindric, .15 to .2 in. long. Dalz. and Gibs. Bomb. Fl. 147; Kurz in Journ. As. Soc. Beng. XLVI. ii. 255, and For. Fl. II. 188; Wight Ic. t. 1309 (*fruit and seeds only*); Hook. f. Fl. Br. Ind. III. 668; Miq. Fl. Ind. Bat. II. 454; Trimen Fl. Ceyl. III. 141; Cooke Fl. Bomb. II. 141; Prain Beng. Plants 679. *Echites paniculata*, Roxb. Fl. Ind. II. 17; Wight Ic. t. 396. *E. coriacea*, Wall. Cat. 1586. *E. manubriata* and *E. polyantha*, Wall. Cat. 1663, 1664. "*Kaka-kodi*," Rheede Hort. Mal. IX. t. 8.

JUNKSEYLON (Tongka): at Puket, Curtis 2933. PENANG: Curtis 1740.—DISTRIB. Western India, Ceylon, Eastern Bengal, Burma, Malay Archipelago, Philippines.

2. ANODENDRON CANDOLLEANUM, Wight Ic. t. 1309 (1850) (*excluding fruit and seeds*). A very large glabrous climbing shrub; branches stout, rather fleshy, somewhat angular, light brown; branch-

lets terete, darker. *Leaves* coriaceous; elliptic, abruptly cuspidate acuminate at apex, cuneate or rounded at base; pale beneath, glabrous on both surfaces, margin recurved; in old leaves slightly cartilaginous; 5 to 9 in. long, 2 to 5 in. broad; midrib stout, impressed and keeled on the upper, raised on the lower, surface; main nerves 8 to 10 pairs, the lowest near the margin, the rest parallel, yellowish, very stout and prominent, about .75 to 1 in. apart along the midrib in old leaves, raised above, starting at from 75° to 80° with the midrib and curving only near the margin and along it; secondary nerves few; reticulations transverse, not prominent, impressed when dry; petiole 1.5 to 2 in. long, stout, twisted, keeled above. *Cymes* terminal and axillary, repeatedly 3-chotomously branched, reaching about 9 in. in length and 4 to 5 in. in breadth; peduncles terete, 1 to 1.5 in. long; branch peduncles long, slender, somewhat flattened; ultimate cymules in corymbose clusters; pedicels .1 to .15 in. long; bracts leafy; bracteoles ovate, acute, scarious, very small, caducous, in pairs at the nodes and below the pedicels; buds conical, spirally striate; flowers reddish or reddish-brown. *Calyx*-lobes ovate, somewhat acute; the margins scarious, not ciliate, .05 in. long; scales 0. *Corolla*-tube cylindrical, scarcely dilated, .05 in. long; lobes oblong falcate, glabrous except the slightly puberulous mouth, .05 in. long, twisted sharply to the left. *Anthers* sagittate, acute, .04 in. long; spur short. *Disk* cupular, entire, undulate, nearly enclosing the glabrous carpels. *Style* short, slender; stigma conical with an annular base. *Follicles* slender, straight, 6 to 7 in. long, .4 in. broad at the broadest one-third of the length up, long-acuminate, slightly turned backwards; pericarp chartaceous, smooth. *Seeds* oblong, flattened, the margins incurved, about 1 in. long, produced in a slender beak of the same length, the upper half of which is furnished with a white silky coma 2 to 2.5 in. long; testa thin, dark brown; albumen copious; cotyledons ovate, acute, .75 in. long, .25 in. broad, prominently nerved; radicle .2 to .25 in. long, cylindric, Hook. f. Fl. Br. Ind. III. 669; Miq. Fl. Ind. Bat. II. 455. *A. rubescens*, Teysm. & Binnend. Cat. Hort. Bogor.

PENANG: West Hill, *Curtis* 2258. PERAK: *King's Collector* 5558, 6516, 7900, 8702. MALACCA: *Capt. Wight*; *Maingay* (K.D.) 1087.—  
DISTRIB. Borneo.

3. ANODENDRON PAUCIFLORUM, Hook. f. Fl. Br. Ind. III. 669 (1882). A climbing shrub; branches smooth glabrous; branchlets terete, dark brown. *Leaves* chartaceous; oblong or oblong-lanceolate, obtusely acuminate at apex, cuneately attenuate at base; glabrous on both surfaces, greenish above and reddish-brown beneath when dry; margins thin, pale when dry or cartilaginous; 3 to 4 occasionally to 5 in. long,

1.25 to 1.5 in. broad; midrib slender; main nerves slender, 8 to 10 pairs, at an angle of about  $60^\circ$  with the midrib, slightly curved to and along the margin; reticulations indistinct; petiole stout, .2 to .3 in. long, winged by the decurrent edges of the blade. *Cymes* terminal and axillary, much shorter than the leaves (rarely .75 to 1 in. long), few- (3 to 15-) flowered; peduncles stout, usually .5 in. long; branches trichotomous, very short, corymbose; pedicels very short; bracts and bracteoles ovate, crowded, small; buds clavate, tip conical, acute and much striate by the twisted corolla-lobes; flowers white or yellowish. *Calyx*-lobes ovate, ciliate, .1 in. long; scales minute, between the lobes. *Corolla*-tube cylindric, dilated below opposite the stamens, gradually attenuate upwards to the narrow throat, .3 in. long; lobes linear-lanceolate, falcate, glabrous without, slightly pubescent within, much twisted to the left, as long as tube. *Anthers* sagittate, with a hyaline apex; filaments very short, broad. *Disk* cupular, glabrous, undulate. *Stigma* sessile, pyriform. *Follicles* straight, divaricate at about  $100^\circ$  to  $120^\circ$ , 4 to 5 in. long, .6 to .7 in. broad a little above the rounded base, then narrowed to the acuminate, slightly incurved tip; pericarp thick, smooth, dark green. *Seeds* obovoid, .6 in. long by .3 in. broad, flat, slightly hooked below, narrowed above to a long slender beak of 1 to 1.25 in. long, the upper half of which is furnished with a spreading white-silky coma 3 to 3.5 in. long; testa thin, dark brown; albumen rather scanty; cotyledons ovate, .45 in. long by .2 to .25 in. broad, fleshy; radicle cylindric, .25 in. long.

PENANG: *Maingay* (K.D.) 1101; *Curtis* 663, 1457, on Government Hill at 1000 to 2000 ft. PERAK: *Wray* 2105, 2569; *King's Collector*, 5587, 5599.

4. *ANODENDRON WRAYI*, King & Gamble, n. sp. A climbing shrub; branches stout, fleshy, with fibrous inner bark and grey outer bark studded with minute lenticels. *Leaves* coriaceous; obovate or obovate-oblong, rounded at apex, with a minute glandular apiculus, cuneate at base; both surfaces glabrous; margin cartilaginous, recurved; 2 to 3.5 in. long, 1 to 1.75 in. broad; midrib very stout, impressed above; main nerves 14 to 16 pairs, parallel, at an angle of  $80^\circ$  or more with the midrib, straight and only slightly curved near the margin, raised above; secondary nerves occasional; reticulations indistinct; petiole .1 to .2 in. long, stout, wrinkled. *Cymes* terminal, corymbose, 3-chorotomous, reaching about 3 in. long and broad; peduncles about .6 in. long; branches as long; pedicels slender, .3 in. long; buds clavate, tips conical, striated by the twisted corolla-lobes; flowers greenish yellow. *Calyx*-lobes ovate, acute, .06 in. long, glabrous, with 3 to 4 rounded scales at the base of each. *Corolla*-tube cylindric, slightly constricted in the middle above the stamens, .25 in. long, glabrous without, densely pubescent within;

lobes ovate, .2 to .25 in. long, rounded, densely tomentose within, twisted to the left. *Stamens* inserted just above the base of the corolla-tube; filaments very short; anthers sagittate; spurs incurved, as long as the pollen-bearing cells. *Disk* cupular, glabrous, undulate. *Ovary* of 2 carpels adherent to the disk; style short, obconoid at top; stigma conoidal. *Fruit* not known.

PERAK: at Gunong Bubu, 5000 ft., Wray 3828, 3836.

5. *ANODENDRON LANCEOLATUM*, King & Gamble, n. sp. A glabrous climbing shrub; branchlets stout, nearly black, longitudinally wrinkled when dry. *Leaves* coriaceous; oblong-lanceolate, tapering to a blunt acumination at apex, narrowly cuneate at base; both surfaces slightly shining, pale brown when dry; margins recurved, broadly crispate; 3.5 to 5.5 in. long, 1 to 1.5 in. broad; midrib stout, channelled above, prominent beneath; main nerves about 15 to 16 pairs, at about 75° with the midrib, straight to join an inconspicuous intramarginal nerve close to the edge; secondary nerves alternate with and similar to the main nerves, branched above; reticulations irregular; petiole .4 to .5 in. broad, channelled above, the edges connivent. *Cymes* axillary, paniculate, nearly half as long as the leaves, reaching 2.5 in. long and about 1.25 in. in diameter; peduncles 1 to 1.5 in. long, flattened, with sometimes a small branch at the base, the next joint of the rachis nearly .5 in. long; side branches short, cymules close; pedicels short, variable; bracteoles ovate, acuminate, small; buds slender, clavate with a conical tip, striated by the twisted corolla-lobes, .225 in. long; flowers pale buff (Wray). *Calyx* shortly campanulate, deeply lobed; lobes ovate, acute, ciliate, .06 in. long. *Corolla*-tube sub-cylindric, dilated below, somewhat constricted above, glabrous except at the base within, .15 in. long; lobes as long as tube, oblong-linear, much twisted. *Stamens* inserted near the base of the tube; anthers sagittate, .06 in. long, tip obtuse or emarginate; empty spurs slender. *Disk* cupular. *Ovary* of 2 carpels, conical; style almost none; stigma conical, acuminate. *Fruit* not known.

PERAK: at Tapa, Wray 1321.

## 26. *CLEGHORNIA*, Wight.

Glabrous climbing shrubs. *Leaves* opposite, membranous, acuminate, penninerved, the main nerves straight. *Flowers* small, in axillary or terminal paniced or corymbose cymes. *Calyx* small, 5-partite, with 5 didymous glands alternate with the lobes. *Corolla* hypocrateriform; lobes 5, overlapping to the right, twisted or not to the left. *Stamens* inserted below the middle of the corolla-tube, conniving over and adhering to the stigma; filaments short; anthers sagittate, the cells shortly spurred at the base. *Disk* of 5 scales, cleft at the apex.

*Ovary* of 2 carpels, sunk in the disk; style short, obconical; stigma conical, apiculate. *Fruit* of 2 long, acuminate, follicular mericarps. *Seeds* oblong, narrowed at the ends, tipped with a deciduous coma; albumen scanty; cotyledons linear, flat; radicle superior.—**DISTRIB.** Ceylon and Malaya; about 3 species.

Leaves elliptic or elliptic-oblong, over 1 in. broad; cymes	
paniculate; corolla-lobes linear-oblong, over .1 in. long	.. 1. <i>C. malaccensis</i> .
Leaves lanceolate; cymes corymbose; corolla-lobes rounded,	
under .05 in. long	.. .. 2. <i>C. gracilis</i> .

1. **CLEGHORNIA MALACCENSIS**, King & Gamble. A slender climbing shrub; branchlets pale brown, terete, often curved in the internodes. *Leaves* membranous; elliptic or elliptic-oblong, abruptly obtusely caudate-acuminate at apex, attenuate to almost rounded at base; bright green above, blueish-green beneath, nearly white when dry; margin recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender, channelled above, raised beneath; main nerves 12 to 14 pairs, slightly impressed above, raised beneath, at about 70° to 80° sometimes at right angles to the midrib, straight and meeting in an intramarginal looped nerve; secondary nerves many, one usually between each pair of main nerves; reticulations few, inconspicuous; petiole .5 to 1 in. long, twisted. *Cymes* terminal, rarely axillary, paniculate, reaching 4 in. in length and breadth; peduncles slender, .75 to 2 in. long, flattened; branches trichotomous, flattened, variable; ultimate cymules subumbellate; pedicels .1 to .2 in. long; bracteoles ovate-subulate, very small; buds oblong-clavate; flowers waxy, white with yellow inside. *Calyx*-lobes lanceolate, ciliate, .075 in. long. *Corolla* tubular-campanulate, .2 to .25 in. long, glabrous except for a minute pubescence near the throat within; lobes as long as tube, linear-oblong; margins incurved, slightly twisted to the left. *Stamens* inserted a little above the base of the tube; filaments slender; anthers sagittate, pubescent on the back, bluntly apiculate; the basal spurs long. *Disk* of 5 slightly bifid scales. *Ovary* scarcely exsert from the disk; style slender; stigma oblong, conical above and often bifid at tip. *Follicles* divaricate at about a right angle, 2.5 to 5 in. long, .25 in. broad, slightly incurved, acuminate, glabrous. *Seeds* linear-oblong or fusiform, .4 to .5 in. long, ending in a flattish point covered with a rather short coma of silky hairs; testa thin, brown. *Baissea malaccensis*, Hook. f. in Fl. Br. Ind. III. 663.

PERAK: *Scortechini* 40; *Wray* 3457; *King's Collector* 5900, 8798, 10799. MALACCA: *Maingay* (K.D.) 1094.

2. **CLEGHORNIA GRACILIS**, King & Gamble, n. sp. A slender climbing shrub, the stem reaching 1 to 2 in. in diam.; branchlets very slender.

dark brown, often curved in the internodes. *Leaves* membranous; lanceolate, long but obtusely caudate-acuminate at apex, cuneate at base; bright green above, paler beneath; margins cartilaginous; 2 to 3 in. long, .5 to .7 in. broad; midrib slender; main nerves 12 to 16 pairs, at about 70° to 80° with the midrib, straight, meeting in an intramarginal looped nerve; secondary nerves frequent, usually one between each pair of main nerves; reticulations indistinct; petiole slender, .25 in. long. *Cymes* axillary and terminal, slender, corymbose, reaching 2 in. in length and breadth; peduncles very slender, .5 to .75 in. long; branches trichotomous, capillary; pedicels .2 in. long; bracteoles very minute, subulate; buds clavate; flowers light yellow. *Calyx*-lobes orbicular, .04 in. in diam.; scales very small or none. *Corolla* urceolate, .1 in. long; tube minutely white-puberulous within; lobes rounded, not twisted, .04 in. long. *Disk* faintly 5-lobed. *Anthers* blunt or slightly emarginate at the tip, with a slender hair-like apiculus. *Fruit* not seen.

PERAK: on Cawfield's hill, 4000 ft., *Scortechini* 384; at 3000 to 4000 ft., clinging to trees, *King's Collector* 6351; *Wray* 3209.

The following Bornean species may eventually be found in the Malay Peninsula:—

CLEGHORNIA BORNEENSIS, King & Gamble, n. sp. A climbing shrub; branchlets purplish-brown when dry, angled, smooth, glabrous. *Leaves* elliptic or elliptic-obovate, abruptly cuspidate-acuminate at apex, rounded at base; both surfaces glabrous, the lower pale; 4 to 5 in. long, 2 to 2.5 in. broad; midrib slender, raised and sharp beneath; main nerves 10 to 12 pairs, parallel, starting at about 70° with the midrib and curving gently upwards to and along the margin; secondary nerves few, chiefly between the upper main nerves; reticulations slender, oblique, more or less parallel; both main nerves and reticulations raised on both surfaces; petiole .2 in. long, bordered above by the crispate decurrent margins of the blade. *Flowers* in axillary and pseudo-terminal, glabrous, corymbose cymes, reaching 6 in. long and 3 in. broad; peduncles slender, .5-1 to 2.5 in. long; primary branches 3-chotomous, rest 2-chotomous; pedicels slender, variable, about .1 to .2 in. long; bracteoles small, ovate, in pairs at the axils and usually 2 in the middle of each pedicel; buds linear-oblong; flowers yellow. *Calyx* campanulate; lobes ovate-acute, thin, .1 in. long, with small scales alternate with them within at the base. *Corolla*-tube cylindric, very slightly dilated at the base, slightly funnel-shaped towards the naked mouth, .3 in. long; lobes ovate, rounded, only very slightly twisted to the left, .15 in. long; the tube and mouth slightly villous within. *Stamens* inserted at the very base of the tube; anthers sagittate, the spurs slender; filaments very short, thick. *Disk* 5-lobed, enclosing the glabrous nearly globose carpels; style thick, obconic; stigma conical, apiculate. *Fruit* not known.

BORNEO: near Kuching, *Haviland* and *Hose* 2169.

27. ICHNOCARPUS, Br.

Climbing shrubs with opposite leaves. *Flowers* small, in lax, many-flowered, terminal and axillary, paniculate cymes. *Calyx* 5-fid, glandular or not within. *Corolla* hypocrateriform, the throat contracted or villous; lobes narrowed to an obtuse point, overlapping to the right, the upper half of each lobe deflexed in bud. *Stamens* inserted at or below the middle of the corolla-tube; filaments very short; anthers sagittate, conniving over and adhering to the stigma; cells spurred at the base. *Disk* free, 5-lobed. *Ovary* of 2 distinct carpels, exserted from the disk, hairy; ovules many; style short, top obconic; stigma columnar. *Fruit* of 2 slender, spreading or divaricate, follicular mericarps. *Seeds* oblong, narrowed at the tip, ending in a deciduous coma; albumen copious; cotyledons long, flat; radicle short, superior.—DISTRIB. India, Malaya, Australia; species 5 or 6.

Leaves usually elliptic, acute, under 1·5 in. broad; inflorescence narrowly paniculate, very rusty-tomentose, under 3 in. long; corolla-tube globose opposite the stamens, contracted above; disk lobes capitate . . . . .

1. *I. frutescens*.

Leaves usually ovate, obtuse or acute, over 1·5 in. broad; inflorescence rather broadly paniculate, 3 to 5 in. long; rachis glabrescent; corolla-tube campanulate opposite the stamens, not contracted above; disk-lobes not capitate . . . . .

2. *I. ovatifolius*.

1. ICHNOCARPUS FRUTESCENS, Ait. Hort. Kew. ed. 2, II. 69 (1811). A much-branched and extensively climbing shrub; branchlets slender, tawny-pubescent; innovations fulvous-tomentose. *Leaves* very variable, chartaceous; elliptic elliptic-oblong or elliptic-lanceolate or lanceolate, acute or acuminate sometimes mucronate at apex, cuneate or slightly rounded-attenuate at base; glabrous on the upper surface, pale and softly red-tomentose or glabrescent beneath; 2 to 4·5 in. long, .75 to 1·5 in. broad; midrib slender, impressed above; main nerves 5 to 7 pairs, curved upwards to and along the margin; reticulations in a fine network, conspicuous in young leaves; petiole .1 to .3 in. long, reddish-tomentose. *Cymes* paniculate, 1 to 3 in. long, terminal and axillary, often forming an elongated leafy thyrsus at the ends of the branchlets, rusty-pubescent or -tomentose; peduncles short; branches trichotomous; pedicels stout or slender, .1 to .2 in. long, often 3 together; bracts leafy, caducous; bracteoles ovate, acute, very small; buds clavate, tip conical; flowers greenish- or yellowish- white. *Calyx*-lobes ovate-acute or lanceolate, .05 to .1 in. long; glands none. *Corolla*-tube .1 in. long, cylindric at base, dilated and nearly globose opposite the stamens and then again constricted; pubescent without where dilated, glabrous within; mouth with slightly thickened folds and villous; lobes .15 to .2 in.

long, linear-falcate, with a twisted sparsely hirsute tip, white-hirsute within. *Stamens* very small; anthers .05 in. long, with small spurs. *Disk* with 5 linear capitate lobes. *Ovary* of 2 villous carpels; style slender, .05 in. long; stigma globose, with a conical tip. *Follicles* very slender, cylindrical, 3 to 6 in. long, .1 to .15 in. broad, curved, rusty-pubescent at first, afterwards glabrous; pericarp thin. *Seeds* linear-cylindric, .4 to .75 in. long, very slender, deeply grooved, scarcely beaked, tipped with a scanty white coma 1 in. long; testa thin, dark brown; cotyledons linear, very thin, .3 to .4 in. long, very narrow; radicle barely .05 in. long. A. DC. Prodr. VIII. 315; Benth. Fl. Austral. IV. 315; Wight Ic. t. 430; Wall. Cat. 1674; Brandis For. Fl. 327; Dalz. & Gibs. Bomb. Fl. 147; Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 669; Miq. Fl. Ind. Bat. II. 448 and Suppl. 556; Trimen Fl. Ceyl. III. 142; Cooke Fl. Bomb. II. 142; Prain Beng. Plants 680. *I. radicans*, Wall. Cat. 1676. *I. dasycalyx*, Miq. l.c. 449. *Echites frutescens*, Wall. Cat. 1674; Roxb. Fl. Ind. II. 12.

PERAK: *Scortechini* 2199; *King's Collector* 820, 7049, 10986.—

DISTRIB. India, Ceylon, Burma, Sumatra, Java, Australia (Queensland).

2. *ICHNOCARPUS OVATIFOLIUS*, A. DC. Prodr. VIII. 435 (1844). A climbing shrub; branchlets blackish-brown, terete; innovations slightly rusty-pubescent. *Leaves* variable, chartaceous; orbicular ovate or elliptic, obtuse acute or cuspidate at apex, rounded or attenuate or cuneate at base; glabrous on the upper surface, glabrous and paler on the lower or the midrib, villous; margins slightly recurved; 3 to 6 in. long, 1.5 to 3 in. broad; midrib slender, impressed above; main nerves 5 to 6 pairs, curved upwards to and along the margin; secondary nerves few; reticulations elegantly netted, conspicuous on the under surface of young leaves, scarcely visible in old ones, impressed above as are the main nerves; petiole slender, usually pubescent, .4 to .6 in. long. *Cymes* paniculate, up to 5 in. long, terminal and axillary, often forming an elongated, broad, leafy thyrus at the ends of the branchlets; the rachises rusty-pubescent or glabrescent; the cymules densely pubescent; peduncles variable; branches trichotomous; pedicels stout, .05 to .1 in. long; bracts leafy or at the uppermost nodes; bracteoles very many, broadly ovate-acute, at the bases of the pedicels; buds obovate, tip rounded; flowers white. *Calyx* campanulate; tube .05 in. long; lobes ovate-acute or -acuminate, .06 in. long; glands none. *Corolla*-tube .1 in. long, pubescent, cylindric below, then dilated opposite the stamens; mouth not contracted, but thickened in a fold within; lobes .15 in. long, linear-falcate, villous within, especially at the tips, much twisted. *Stamens* very small; anthers .04 in. long, with small spurs, tip



acute. *Disk* with 5 linear-subulate, not capitate, lobes. *Ovary* of 2 villous carpels; style slender, .03 in. long; stigma globose, with a long conical tip. *Follicles* cylindric, divaricate, densely rusty-pubescent. Hook. f. Fl. Br. Ind. III. 670; Miq. Fl. Ind. Bat. II. 449. *I. affinis*, Herb. Ind. Or. Hook. f. & Th. *I. latifolius*, Herb. Ham. in Wall. Cat. 1652. *Echites affinis*, Roem. & Sch. Syst. IV. 393. *Springia indica*, Muell. & Van Heurck in Plant. Nov. Van Heurck 143.

PENANG: *Curtis* 810, 3082. PROVINCE WELLESLEY; *Ridley* 9392. PERAK: *Scortechini*; *Kunstler* 181; *King's Collector* 10531. MALACCA: *Griffith*; *Maingay* (K.D.) 1075, 1103. PAHANG: *Ridley* 2179. SELANGOR: *Ridley*.—DISTRIB. India (Sylhet and Khasia Hills), Sumatra, Borneo, Celebes, Timor, Philippines.

## 28. AGANOSMA, G. Don.

Stout evergreen climbing shrubs. *Leaves* opposite. *Flowers* in many-flowered, terminal or axillary, tomentose or puberulous cymes, large or medium-sized, often sweet-scented, usually white. *Calyx* 5-partite to the base or nearly so; lobes lanceolate, more or less gland-bearing at the base within. *Corolla* hypocrateriform, lower part of the tube cylindric, upper campanulate or cylindric, broader than the lower, bearing villous longitudinal bands behind the anthers; lobes broad or narrow, overlapping to the right, twisted more or less to the left. *Stamens* inserted on the base of the upper part of the corolla-tube; filaments very short; anthers sagittate, conniving over and adherent to the stigma; the cells spurred at the base, upper half only pollen-bearing. *Disk* cupular or cylindric, 5-lobed. *Ovary* of 2 distinct carpels, included in or somewhat exsert from the disk, usually hirsute, many-ovuled; style short, top urn-shaped; stigma columnar, conical at tip. *Fruit* of 2 terete, straight or curved, follicular mericarps. *Seeds* oblong-obovate or linear-obovate, flattened, not beaked, tipped with a deciduous silky coma; testa thin; albumen scanty; cotyledons oblong; radicle short, superior.—DISTRIB. India and Malaya; about 6 species.

Calyx-glands many, opposite the lobes, which are .25 in. long; ovary half-exsert from the disk; corolla-lobes narrow, linear; leaves with a prominent intramarginal nerve .. 1. *A. marginata*.  
Calyx-glands under 5, alternate with the lobes, which are .75 to 1 in. long; ovary included in the disk; corolla-lobes broad, rhomboid; leaves without a prominent intramarginal nerve .. 2. *A. calycina*.

1. AGANOSMA MARGINATA, G. Don Gen. Hist. Dichl. Pl. IV. 77 (1838). A stout scandent or subscandent shrub; branches stout, prominently dotted with raised warts; branchlets slender, brown, lenticellate; innovations glabrous or rusty-pubescent; nodes, both of branches and

branchlets, with prominent ridges. *Leaves* membranous; oblong-lanceolate or elliptic-oblong, acuminate at apex often abruptly, rounded at base; glabrous above, glabrous or pubescent beneath; 2 to 5 in. long, .75 to 1.5 in. broad; midrib slender, channelled above, raised beneath; main nerves 12 to 16 pairs at an angle of about 60° with the midrib, slightly arching to meet in a prominent intramarginal looped nerve, the lowest 1 or 2 pairs occasionally free, raised beneath; secondary nerves also prominent, usually one between each pair of main nerves; reticulations netted; petiole .15 to .25 in. long, slender. *Cymes* terminal or more often axillary, di-tri-chotomous, puberulous, variable in size but reaching to about 4 in. in length and 3 in. in breadth; peduncles about 1 to 2 in. long; branches gradually shorter; ultimate cymules corymbose; pedicels .15 in. long; bracts caducous; bracteoles linear-subulate, .25 in. long; buds cylindrical, slender; flowers white. *Calyx*-tube almost none; lobes lanceolate-acuminate, .25 in. long, glabrous or pubescent, nerved, with many small subulate glands at the base within, especially on the inner lobes. *Corolla*-tube cylindric above, enlarged at the base below the stamens and sometimes slightly constricted near the mouth, which is thickened, .25 in. long, glabrous except for 5 villous bands behind the anthers within; lobes narrow, linear, acute, .5 to .7 in. long. *Stamens* inserted a little above the base of the tube; anthers lanceolate-acuminate, .15 in. long; filaments very short. *Ovary* of 2 obtuse carpels, glabrous, half sunk in the disk; style slender, annulate at top; stigma conoidal. *Follicles* pendulous, slender, slightly divergent, .52 to 1.5 ft. long, .3 to .4 in. broad, glabrous, dark brown, speckled, at first joined at the tip. *Seeds* linear-oblong, .3 in. long, crowned with a silky coma 1.5 in. long; albumen very scanty. Wight Ic. t. 425; A. DC. Prodr. VIII. 433; Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 663; Prain Beng. Plants 679. *A. acuminata*, G. Don l. c.; Wight Ic. t. 424; A. DC. l. c. 434; Miq. Fl. Ind. Bat. II. 447. *A. macrocarpa*, A. DC. l. c. 434; Miq. l. c. *Echites marginata*, Roxb. Fl. Ind. II. 15; Wall. Cat. 1661. *E. acuminata*, Roxb. l. c. *E. macrocarpa*, Wall. Cat. 1662. *E. reticulata*, Boj. Hort. Maur. 211. *E. apoxys*, Voigt Hort. Sub. Calc. 522. ? *E. cristata*, Roth. Nov. Pl. 135. ? *Chonemorpha cristata*, G. Don l. c. 76.

TRANG: *Curtis* 3393; *King's Collector* 1426. KEDAH: on Langkawi Island, *Curtis* 2792. PENANG: *Curtis* 664. PERAK: *Scortechini* 6, 7, 68; *King's Collector* 7321. MALACCA: *Griffith*; *Maingay* (K.D.) 1076, 1000 to 1002. PAHANG: *Ridley* in Trans. Linn. Soc., Ser. 2, III. 3219. SINGAPORE: *Murton* 74.—DISTRIB. India (Sylhet and Chittagong), Burma, Java, Sumatra, Philippine Islands.

2. *AGANOSMA CALYCINA*, A. DC. Prodr. VIII. 432 (1844). An immense (Scortechini) climbing shrub; branchlets stout, as thick as a goosequill, ferruginous-puberulous; nodes faintly ringed. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong or elliptic-ovate, shortly and abruptly acuminate at the rounded apex, attenuately rounded at base; glabrous on both sides except for a few sparse hairs beneath; margins recurved; 3·5 to 6 in. long, 1·5 to 3·5 in. broad; midrib stout, impressed above, raised beneath; main nerves 7 to 10 pairs, starting at an angle of about 80° to 85° with the midrib and curving upwards to and along the margin; secondary nerves few, inconspicuous; reticulations minutely netted, impressed and prominent beneath; petiole ·5 in. long, articulate. *Cymes* terminal, sessile, dichotomous, rusty-puberulous, corymbosely flattened, reaching to 5 in. in length and 8 in breadth; main peduncles 1 to 3 in. long, somewhat flattened, stout; branches similar but shorter and thinner; pedicels ·5 to ·75 in. long; bracts leafy, ovate-acuminate, caducous; bracteoles lanceolate, similar to calyx-lobes; buds conical; flowers large, white, handsome. *Calyx*-lobes lanceolate acuminate, ·75 to 1 in. long, fulvous-tomentose, the inner 3 broadly keeled on the back; scales minute, subulate, 3 to 5 at the base within and between the lobes. *Corolla*-tube cylindric, rather stout, lower part narrowed, upper part broad and then slightly narrowed upwards, ·4 to ·5 in. long, 5-sulcate, pubescent without, ferruginous-villous within in bands behind the stamens; lobes rhomboid, broad, half glabrous, half tomentose, as long as tube, twisted to the left. *Stamens* inserted on the broadest part of the tube within; filaments very short, densely villous; anthers sagittate, very slender, ·3 in. long; basal spurs somewhat rounded; connective pubescent. *Disk* glabrous, conical, 5-furrowed and -lobed, ·15 in. long, enclosing the ovary. *Ovary* of 2 carpels, glabrous below, long-villous above; style slender, enlarged upwards and dilated into a villous lobed cup; stigma conical, elongate. *Fruit* not seen. Kurz in Journ. As. Soc. Beng. XLVI. ii. 256, and For. Fl. II. 186; Hook. f. Fl. Br. Ind. III. 664. *A. Roxburghii*, G. Don Ex. Wight Ic. t. 440. *A. Wallichii*, G. Don Gen. Hist. Dichl. Pl. IV. 77. *Echites calycina*, Wall. Cat. 1653. *E. caryophyllata*, Roxb. Fl. Ind. II. 11.

PERAK: *Scortechini* 16, from Gunong Chabary; *King's Collector* 10808.—DISTRIB. Tavoy.

## 29. TRACHELOSPERMUM, Lemaire.

Climbing shrubs. *Leaves* opposite, penninerved. *Flowers* white or purplish, in lax terminal or pseudo-axillary cymes. *Calyx* small, 5-partite, with 5 to 10 small scales or glands at the base within. *Corolla* hypocrateriform, the tube cylindric, dilated opposite the stamens, con-

stricted at the mouth and sometimes almost closed with the folds; lobes 5, oblique, twisted to the left, overlapping to the right. *Stamens* inserted above the middle of the tube, included or the apices shortly exsert; filaments very short, broad; anthers sagittate, shortly acuminate, connivent around the stigma and adhering to it; the cells produced below in sharp spurs. *Disk* annular, truncate or 5-lobed. *Ovary* of 2 carpels, longer than the disk; style filiform; stigma columnar, base shortly ringed, tip conical; ovules very numerous. *Fruit* of 2 elongate incurved follicular mericarps. *Seeds* linear, not beaked, crowned at the apex with a long dense coma; albumen copious; cotyledons linear, flat; radicle short, superior.—*DISTRIB.* India, Malaya and Eastern Asia as far as Japan; about 8 species.

*TRACHELOSPERMUM CURTISH*, King & Gamble, n. sp. A climbing shrub; branchlets terete, slender, uppermost with innovations and inflorescence tawny-villous; nodes with a prominent pubescent ridge. *Leaves* membranous; elliptic or elliptic-ovate, abruptly acuminate at apex, auriculately cordate at base; strigosely hispid on both surfaces especially on the nerves, finally glabrous; 3 to 5 in. long, 2 to 3 in. broad; midrib slender, impressed and keeled in old leaves; main nerves 8 to 10 pairs, the lowest pair small deflexed, the rest at about 50° to 60° with the midrib, curved upwards to meet in an inconspicuous looped intramarginal nerve, and joined by the prominent transverse reticulations; petiole .3 to .5 in. long, tawny-villous. *Cymes* terminal, sessile, corymbose, tawny-villous, up to 6 in. long and 8 in. in diam.; main branches 3 to 5; cymules congested; pedicels short, .1 to .2 in. long; bracts leafy, caducous; bracteoles linear-subulate, densely tawny-villous at the joints and the bases of the pedicels; buds clavate, apex conoidal; flowers white, very sweet-scented. *Calyx*-lobes linear-lanceolate, slightly villous without, .1 in. long, longer than the tube, with small subulate scales at the base between the lobes. *Corolla*-tube narrowed below, then dilated opposite the stamens, then gradually narrowed to the constricted mouth, .5 to .6 in. long in all, glabrous within; lobes obliquely triangular-spathulate, dentate at apex, .4 to .5 in. long, twisted to the left, glabrous. *Stamens* inserted at or a little below the middle of the tube; filaments stout, short, rugose, decurrent below; anthers sagittate, membranously apiculate; spurs as long as or longer than the pollen-bearing cells, slender, incurved below. *Disk* annular, 5-lobed, fleshy; lobes slightly emarginate. *Ovary* of 2 carpels, villous above, rounded; style slender, gradually enlarged; stigma columnar, obscurely angled, with a short spreading ring below and conical point. *Follicles* 8 to 9 in. long, .25 in. broad, somewhat flattened, divergent at about right angles and curved inwards to an acute tip; pericarp scabrous-puberulous,

dark brown with a reddish tinge. *Seeds* oblong, .7 to .8 in. long, .2 in. broad, acute at base, slightly narrowed above and then broadening below the 1 to 1.5 in. long white-silky persistent coma; testa thin, dark brown; albumen moderate; cotyledons lanceolate, .5 to .6 in. long, .1 in. broad; radicle short.

PENANG: at Balick Pulau, *Curtis* 838. PERAK: *King's Collector* 5194.

We have been a good deal in doubt of the genus of this species; in the Kew Herbarium it was placed with *Chonemorpha*, but the comparatively small flowers and different seeds distinguish it from that genus; in some respects it comes most nearly to *Epigynum*, but on the whole we prefer to keep it where we first placed it in *Trachelospermum*, to which genus it seems to us to come most near, especially in the characters of the inflorescence and the fruit. There is in the Kew Herbarium a species (unnamed) which approaches very near to this. It has been sent from the Khasia Hills (*Hook. f. and Th.*); from Manipur (*Watt* 7272); and from Yunnan (*Henry* 12136). When it comes to be described with full material, it is by no means unlikely that the two will be found to require a new genus.

### 30. EPIGYNUM, Wight.

Climbing shrubs. *Leaves* opposite, penninerved, the nerves arching. *Flowers* caescent-tomentose, in dense subcapitate corymbose or paniculate leafy cymes at the ends of the branches. *Calyx* small, 5-fid; the lobes narrow, eglandular or with few glands. *Corolla* hypocrateriform; the tube elongate, dilated opposite the stamens; the throat villous, without scales; lobes 5, twisted to the left or nearly erect, overlapping to the right. *Stamens* inserted below the middle of the tube, included; filaments short; anthers linear-sagittate, acuminate, connivent around the stigma and hardly adhering to it; cells spurred at the base. *Disk* fleshy, 5-lobed, lining the calyx-tube. *Ovary* of 2 distinct carpels, dorsally adnate to the disk and surmounted by it; style filiform; stigma cylindric, with annular base and conical tip; ovules many in each carpel. *Fruit* of two linear terete distinct follicular mericarps sometimes torulose. *Seeds* elongate, compressed, broad at the tip and crowned with a thick coma of silky hairs; testa very thin; albumen moderate or scanty; cotyledons oblong, narrow, foliaceous; radicle short, superior.—DISTRIB. Malay Peninsula and Archipelago; about 4 to 5 species.

Leaves elliptic; main nerves 6 to 7 pairs, straight at first:—

- |                                                              |    |                      |
|--------------------------------------------------------------|----|----------------------|
| Leaves glabrous beneath except for tufts in the nerve-axils; |    |                      |
| corolla-tube grey-tomentose without .. ..                    | 1. | <i>E. perakense.</i> |
| Leaves tomentose beneath, not tufted in the nerve-axils;     |    |                      |
| corolla-tube tawny-tomentose without .. ..                   | 2. | <i>E. Maingayi.</i>  |

Leaves lanceolate; main nerves 7 to 8 pairs, curved; corolla-tube greyish-tawny-tomentose:—

- |                                                                                                                         |    |                     |
|-------------------------------------------------------------------------------------------------------------------------|----|---------------------|
| Leaves prominently tawny-villous in the nerve-axils and along the midrib beneath, otherwise glabrous; flower-buds under |    |                     |
| .75 in. long; corolla-lobes rounded at tip .. ..                                                                        | 3. | <i>E. Curtisii.</i> |

Leaves not tufted in the nerve axils, sparsely strigose-hirsute beneath; flower-buds over 1 in. long; corolla-lobes squared at tip .. .. . 4. *E. Ridleyi*.

1. *EPIGYNUM PERAKENSE*, King & Gamble, n. sp. A large climbing shrub; branchlets slender, reddish-brown, terete, uppermost and innovations minutely puberulous; nodes ringed. *Leaves* membranous; elliptic or elliptic-oblong, acute or shortly acuminate at apex, acute-cuneate rhomboid or almost rounded at base; glabrous on both surfaces except for tufts of hair in the axils of the main nerves beneath; margins slightly recurved; 2 to 4 in. long, 1·5 to 2·5 in. broad; midrib slender, pale, raised beneath; main nerves 6 to 7 pairs, prominently raised beneath and pale, at from 50° to 70° with the midrib, nearly straight, meeting in a widely looped intramarginal nerve; secondary nerves few; reticulations irregular, scanty, prominent; petiole ·25 to ·5 in. long, twisted, articulate. *Cymes* terminal or axillary, crowded, grey-tomentose, trichotomous, up to about 1·5 to 2 in. long and broad; peduncles none or short; branch peduncles short; pedicels about ·15 in. long; bracts leafy, caducous; bracteoles many, usually 2 to 3 to each pedicel, ovate-acuminate, similar to the calyx-lobes; buds clavate, twisted, ·5 to ·75 in. long; flowers white. *Calyx* small, lobes ovate-acuminate, ·075 in. long, with minute scales at the base. *Corolla*-tube cylindric, dilated below opposite the stamens, ·6 to 7 in. long, grey-tomentose without, slightly villous within; throat with tufts of hair between the lobes; lobes ·25 in. long, oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on the upper, tomentose on the lower half without. *Stamens* inserted a little above the base of the tube; filaments short, slender; anthers sagittate-acuminate with long spurs, ·15 to ·175 in. long. *Disk* annular, 5-lobed, glabrous. *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it; style slender; stigma cylindric, with a spreading ring below and conical tip. *Follicles* 10 to 12 in. long, densely brown-tomentose when young, tawny-puberulous when old, divaricate at about a right angle, torulose, the swellings opposite the seeds nearly ·25 in. in diam., between them about ·1 in.; pericarp chartaceous, thin. *Seeds* slender, fusiform, 1 in. long, flattened, gradually broadening upwards to an oblique tip, and furnished with a 1 in. long white silky coma; testa thin, scabrous; cotyledons narrowly linear-oblong, ·25 in. long; radicle very small, ·05 in. long.

PERAK: *Wray* 1802, 1946, 2365, 4267; *Scortechini* 1474; *King's Collector* 1971, 2324.

This species comes near to *E. Griffithianum*, Wt., but has rather different more acuminate leaves with pale nerves when dry, and larger flowers not so villous within.

2. *EPIGYNUM MAINGAYI*, Hook. f. in Fl. Br. Ind. III. 666 (1882). A climbing shrub; branchlets slender with ferruginous tomentum. *Leaves* membranous; elliptic, acute both at apex and at base; glabrous or minutely puberulous on the upper, yellowish-brown-tomentose on the lower surface; margin slightly recurved; 3·5 to 4·5 in. long, 1·5 to 2·5 in. broad; midrib stout, prominently raised beneath; main nerves 6 to 7 pairs, at about 60° with the midrib, at first nearly straight, then slightly curving to join an intramarginal looped nerve; secondary nerves few, inconspicuous as are the rather distant reticulations; petiole ·25 in. long, tawny-tomentose. *Cymes* terminal or axillary, trichotomous, tawny-tomentose, reaching about 3 in. in length and 2 in. in breadth; peduncles 1 to 1·5 in. long; main branch peduncles ·5 to ·75 in. long, cymules paniculate; pedicels ·2 to ·3 in. long, stout; bracts leafy, deciduous; bracteoles ovate-acuminate, ·075 to ·1 in. long, 3 to each pedicel; buds clavate, whitish-brown-tomentose, ·5 to ·75 in. long; flowers white. *Calyx* small; lobes ovate-acuminate, ·1 in. long, each with about 3 subulate pubescent scales at the base within. *Corolla*-tube cylindric, tawny-tomentose, slightly dilated below opposite the stamens, gradually enlarged above, with 5 villous longitudinal lines within, ·6 to ·7 in. long; throat with tufts of hair between the lobes; lobes oblong, crenulate, rounded, twisted to the left, glabrous within, glabrous on one half and tomentose on the other half without. *Stamens* inserted a little above the base of the tube; filaments slender; anthers very narrowly sagittate, long-acuminate above and with spurs as long below, ·175 in. long in all. *Disk* annular, faintly undulate on the margin, glabrous. *Ovary* of 2 glabrous carpels attached to the disk at their backs and within it; style slender; stigma slender, cylindric, ·1 in. long, with a spreading ring below and conical point above. *Follicles* 6 to 8 in. long, ·15 to ·25 in. broad, slender, cylindric, flexuous, rusty-tomentose. *Seeds* fusiform, pubescent, compressed, ·6 to ·7 in. long, obliquely truncate at top and crowned with a coma of white silky hairs.

PERAK: in open bamboo forests, 400 to 600 ft., *King's Collector* 8734. MALACCA: *Maingay* (K.D.) 1088. SELANGOR: at Kwala Lumpor, *Ridley*.

3. *EPIGYNUM CURTISII*, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, uppermost and innovations puberulous. *Leaves* membranous; lanceolate, acuminate at apex, attenuate and finally rounded at base; glabrous above, glabrous beneath except along the midrib and for the large hairy tufts in the axils of the main nerves; margins slightly recurved; 3·5 to 4·5 in. long, 1 to 1·5 in. broad; midrib slender, raised beneath; main nerves 7 to 8 pairs, at an angle of 60°

with the midrib, curving upwards and branching to form an obscure intramarginal looped nerve; secondary nerves not conspicuous; reticulations irregular, prominent beneath; petiole .25 in. long. *Cymes* terminal and axillary, pubescent, paniculate, few- (20- to 25-) flowered, reaching 3 to 3.5 in. long and about 1.5 in. broad; peduncles none or short, as are the branches; pedicels .15 to .2 in. long; bracts leafy, persistent; bracteoles ovate-acute, small, 1 to 2 at the base of each pedicel; buds elongate-clavate, .5 to .75 in. long; flowers white. *Calyx*-tube .05 in. long; lobes ovate-acuminate, reflexed, with 1 or 2 small scales at base within. *Corolla*-tube cylindric, slightly dilated below opposite the stamens, greyish-tawny-tomentose without and with pubescent lines within, .6 in. long; throat with a villous ring; lobes obovate, .3 in. long, twisted slightly to left in flower, more so in bud, glabrous within, glabrous without on upper, pubescent on lower half which is exposed in bud. *Stamens* inserted a little above the base of the tube; filaments slender; anthers narrowly sagittate, long-acuminate, .175 in. long; spurs long and slender. *Disk* annular, shortly lobed. *Ovary* of 2 glabrous carpels attached by their backs to the disk and within it; style slender; stigma conical, .075 in. long, with a spreading ring below. *Fruit* not seen.

PENANG: on the road to Penara Bukit, at 2000 ft., *Curtis* 2441.

4. *EPIGYNUM RIDLEYI*, King & Gamble, n. sp. A slender climber; branchlets brown, terete, uppermost parts tawny-pubescent, nodes slightly raised. *Leaves* chartaceous; lanceolate or elliptic-lanceolate, acuminate at apex, attenuate at base; glabrous on the upper surface, sparsely strigosely-hirsute on the lower, especially on the nerves; margin slightly recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender but prominent; main nerves 8 to 10 pairs, at an angle of about 60° with the midrib, nearly straight to meet a looped intramarginal nerve; secondary nerves irregular; reticulations few, transverse; petiole slender, .25 to .5 in. long, pubescent, channelled above. *Cymes* terminal, densely rusty-villous; the branches sessile or pedunculate, few-flowered (7 to 8), trichotomous; bracts leafy, the lowest similar to the leaves, the succeeding ones smaller by degrees; bracteoles minute, ovate-acute, on the short (.2 to .3 in. long) pedicels; buds very slender with narrowly conical tips, 1.5 to 1.75 in. long, densely pubescent; flowers white. *Calyx*-tube short; lobes ovate, acuminate, villous without, glabrous within, .15 in. long; scales none or very minute. *Corolla*-tube very slender, enlarged below opposite the stamens, gradually widening above, 1 to 1.5 in. long; rusty-villous without, also in vertical lines within, otherwise glabrous; lobes rhomboid, crenate, glabrous except the lower part outside which is exposed in bud, .25 to .3 in. long, twisted slightly



to the left. *Stamens* inserted a little above the base of the tube; filaments .15 in. long, flattened, puberulous; anthers sagittate, .25 in. long, with a membranous tip and long basal spurs. *Disk* 5-lobed; lobes sparsely long hirsute. *Ovary* of 2 glabrous carpels within the disk; style slender; stigma long cylindric, with a spreading fimbriate ring below and conical tip. *Fruit* not known.

PERAK: at Rawang, *Ridley* 7567.

The following species is here described as likely to be eventually found in the Peninsula:—

EPIGYNUM FORBESII, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, uppermost minutely puberulous. *Leaves* chartaceous; elliptic or elliptic-oblong, acute or shortly acuminate at apex, cuneate at base; glabrous or with scattered hairs above, glabrous beneath; 3.5 to 5.5 in. long, 1 to 2.5 in. broad: midrib slender, prominent beneath; main nerves 8 to 10 pairs, arching upwards to and along the margin and meeting in an intramarginal looped nerve, raised beneath; secondary nerves many; reticulations distant, irregular; petiole .2 to .4 in. long, twisted. *Cymes* terminal and axillary, about 20-flowered, congested, tawny-tomentose, sessile or very shortly peduncled; bracts leafy; bracteoles small, ovate-acuminate, 2 to 3 at the bases of the .1 in. long pedicels; buds clavate with large conical heads; flowers white. *Calyx*-lobes ovate-acuminate, .1 to .15 in. long, eglandular. *Corolla*-tube slender, cylindric, dilated below opposite the stamens, often twisted, 1 in. long; lobes spathulate, crenulate, glabrous except the part exposed in the bud, twisted to the left, .6 in. long. *Stamens* inserted a little above the base; filaments short, slender; anthers narrowly sagittate, acuminate. *Disk* glabrous, 5-lobed. *Ovary* of 2 glabrous carpels adnate to the disk; style slender; stigma cylindric, with a spreading ring below and conical tip. *Fruit* not seen.

SUMATRA: near Bijin Telok, 500 ft., *Forbes* 3236. Haviland's No. 3048 from Kuching, Borneo, resembles this very closely, but has the leaves more lanceolate and longer acuminate.

### 31. MICRECHITES, Miq.

Large climbing shrubs with pubescent inflorescence, otherwise glabrous. *Leaves* opposite, penninerved. *Flowers* small, in axillary and terminal dichotomous thyrsoid or brachiate paniced cymes. *Calyx* small, deeply 5-fid or 5-partite, with obtuse lobes, many-glandular within. *Corolla* subhypocateriform; the tube ovoid-campanulate, naked at the mouth; lobes 5 falcate, very oblique, sometimes forked, the upper half deflexed in bud, overlapping to the right. *Stamens* inserted near the bottom of the tube, included; filaments short; anthers sagittate, conniving round and adhering to the stigma; cells produced at the base into empty spurs. *Disk* annular or cupular, entire or 5-lobed. *Ovary* of 2 distinct carpels, longer than the disk; style short; stigma ovoid or oblong, with a short obtuse apiculus; ovules very many. *Fruit* of 2 divaricate, thick, subterete, follicular mericarps. *Seeds* generally few, linear-oblong, compressed, not beaked, with a terminal persistent coma;

albumen scanty; cotyledons narrowly linear, elongate; radicle very short.—DISTRIB. India and Malaya, about 4 species.

Leaves almost coriaceous, broad; inflorescence many-branched, many-flowered; corolla-lobes short, often forked, reflexed .. 1. *M. polyantha*.

Leaves chartaceous, narrow; inflorescence scarcely branched, very few-flowered; corolla-lobes long, not forked, spreading .. 2. *M. elliptica*  
var. *Scortechinii*.

1. *MICRECHITES POLYANTHA*, Miq. Fl. Ind. Bat. II. 457 (1856). A slender climbing shrub; branches obscurely angled; branchlets dark brown, terete; innovations sparsely pubescent. *Leaves* chartaceo-coriaceous; elliptic-obovate elliptic-oblong or oblong-lanceolate, obtuse or obtusely acuminate at apex, cuneate attenuate or sometimes slightly rounded at base; glabrous on both surfaces; 2 to 4·5 in. long, 1 to 2 in. broad; midrib stout, prominent beneath; main nerves 10 to 15 pairs, slender, at an angle of 60° to 70° with the midrib, nearly straight to join in an obscure intramarginal nerve; secondary nerves many, similar to and between but more slender than the main nerves; reticulations very oblique; petiole ·5 to 1 in. long, channelled above, often twisted. *Cymes* terminal and axillary, thyrsoïd, rusty-tomentose, much branched, at length often elongating in slender bracteolate racemes, reaching 5 to 7 in. in length and 3 in. in breadth; rachises angular or flattened; peduncle 0 to 2 in. long; pedicels very short and stout, ·05 to ·1 in. long; bracts lanceolate, caducous; bracteoles very many, persistent, ovate, acute or obtuse, conspicuous especially after the fall of the flowers; buds ovoid or conical; flowers white. *Calyx* campanulate; lobes ovate, rounded, rusty-tomentose without, glabrous within, ·05 to ·15 in. long; the base inside furnished with minute scales mixed with villous hairs. *Corolla* campanulate or urceolate, ·15 to ·2 in. long, contracted at the mouth, glabrous without, puberulous within; lobes falcately lanceolate with a knee at the base, or bilobed, the divisions unequal, much reflexed, pubescent at the mouth, ·05 to ·125 in. long. *Anthers* acuminate. *Ovary* densely villous. *Follicles* terete, cylindric, 6 to 12 in. long, divergent at about 120° and curving upwards so as nearly or quite to meet again, acuminate at tip; pericarp thin, dark brown, glabrous. *Seeds* linear-oblong, narrow, compressed, 1 to 1·5 in. long, somewhat enlarged at the apex and furnished with a thick, close, persistent, tawny coma 2 in. long; testa thin, dark brown; albumen scanty; cotyledons linear, very slender, 1 in. long; radicle minute. Hook. f. Fl. Br. Ind. III. 671. *Tabernaemontana polyantha*, Blume Bijd. 1029; A. DC., Prodr. VIII. 376.

PENANG: *Curtis* 850; *Ridley* 9426. PERAK: *Ridley* 2896; *Wray* 1815, 2604; *King's Collector* 4430, 5875, 6564, 6840, 8404, 8859, 10003.

SELANGOR: *Ridley* 7412. MALACCA: *Maingay* (K.D.) 1081.—DISTRIB. Andaman Islands, Java.

Some of the specimens examined differ in the size of the flowers; in the inflorescence, and in the greater or less bifurcation of the corolla-lobes, but we have not succeeded in separating any of them as species or even varieties, and prefer to consider them all as forms of one.

2. *MICRECHITES ELLIPTICA*, Hook. f. Fl. Br. Ind. III. 671 (1882). *Rhyncospermum* 4, Herb. Ind. Or. Hook. f. & Th.

India in Sikkim Himalaya at 4000 to 6000 ft., and Khasia Hills at 3000 to 4000 ft.

VAR. *Scortechinii*, King & Gamble. A climbing shrub. *Leaves* chartaceous; lanceolate, obtusely long-acuminate at apex, cuneate at base; glabrous on both surfaces; 3 to 3·5 in. long, 1 to 1·5 in. broad; main nerves 10 to 12, very slender, not conspicuous; secondary nerves many; reticulations oblique; petiole ·25 in. long. *Cymes* terminal or axillary, very few-flowered, scarcely reaching 1 to 1·5 in. long, minutely puberulous; pedicels slender, ·2 in. long; bracteoles ovate, persistent; buds ovoid, obtuse. *Calyx*-lobes ovate, ciliate, rounded, ·075 in. long. *Corolla*-tube cylindric, ·1 in. long, constricted slightly at the mouth; lobes linear-oblong, ·15 in. long, twisted, glabrous, much turned to the left. *Anthers* sagittate, acuminate; filaments very short. *Ovary* densely villous. *Fruit* not known.

PERAK: *Scortechinii*.

This may prove, when better specimens are available, to be incapable of separation from the Indian type.

#### Family LXXVI. ASCLEPIADACEÆ.

Herbs or shrubs, erect or more usually twining, often with a tuberous rootstock or fleshy roots; juice milky or watery; stems simple or branched, usually woody, sometimes succulent. *Leaves* opposite or whorled, sometimes wanting, very rarely alternate; thin or fleshy, quite entire, sometimes with an interpetiolar stipular line or teeth. *Flowers* hermaphrodite, very variable in size and form but always regular; solitary or few or many together, in umbels, umbel-like cymes, fascicles or racemes, axillary, lateral between the bases of the leaves or terminal. *Calyx* inferior, of 5 sepals or 5-lobed; lobes imbricate, usually with minute glandular scales at the base within. *Corolla* hypogynous, gamopetalous, regular, 5-lobed, various in shape; tube usually short (long in *Ceropegia*), sometimes furnished within or at its mouth with variously shaped processes forming a *corolline corona*; lobes imbricate, contorted or valvate in æstivation, often recurved, sometimes more or less erect and connate at their tips. *Stamens* 5, inserted at or near the base of the corolla and alternate with its lobes, rarely higher up; *filaments* some-

times free, more usually connate in a tube around the ovary, forming with the anthers and their terminal appendages a *staminal column*, with the apex often united to the dilated part of the style, usually with more or less fleshy processes on the back forming a *staminal corona*; anthers free or united to the dilated part of the style, 2-celled; the cells dehiscing by apical longitudinal or transverse slits; the margins of the anthers or their basal prolongations below the cells more or less horny and wing-like (the *anther-wings*), usually projecting outwards; the adjacent wings of each pair of anthers nearly meeting and forming between them very narrow fissures leading to the stigmatic cavities; connectives of the anthers often produced into membranous rarely fleshy or inflated terminal appendages which are sometimes connate; pollen-contents of each anther-cell granular or united into one or two waxy masses (*pollen-masses*) formed of an indefinite number of pollen-grains and attached in pairs or in fours, sometimes directly but more usually by means of arm-like *caudicles* to each of the 5 small, usually horny, turgid or bilobed *pollen-carriers*, which rest one on each of the 5 angles of the dilated part of the style, the whole forming the *pollinia*, the masses attached to each pollen-carrier always being derived from the cells of two different but adjacent anthers; when granular, each granule is formed of about 4 pollen-grains united together, and, on the dehiscence of the anthers, the whole is loosely contained in the horny spoon-, trumpet-, or trowel-like or bifid *appendicle* tapering downwards into a short or long *caudicle* attached to a soft (adhesive?) pollen-carrier gland. *Ovary* superior, of 2 one-celled, many-ovuled, carpels, free below; the styles united above and dilated into a pentagonal disk (*style-apex*) which is flat or depressed in the centre, with or without a conical or otherwise shaped tip, and bears on its angles the pollen-carriers and immediately beneath them, behind the fissures between the anther-wings, the 5 stigmatic cavities; ovules usually numerous, rarely few or solitary, anatropous, pendulous, imbricate in several series on the projecting placenta. *Fruit* of 2 (or 1 by suppression) divaricate or parallel follicular mericarps, dehiscing by the ventral suture and usually liberating the placenta; pericarp usually smooth, sometimes echinate or winged. *Seeds* usually flat, sometimes ovoid or cylindric, usually with a broad or narrow margin, generally crowned with a *coma* of long silky hairs, sometimes fringed, sometimes without any tuft; testa thin or thick; albumen usually thin, sometimes rather thick, sometimes none; embryo large, nearly or quite filling the seed; cotyledons flat; radicle usually cylindric, superior. — **DISTRIB.** A large Family of more than 1800 species, widely distributed over tropical and subtropical, with a few in temperate, regions.

As in the Family *APOCYNACEÆ*, in which we were much assisted by Dr. O. Stapf's account of it in the 'Flora of Tropical Africa,' Vol. IV. Sect. 1, so in *ASCLEPIADACEÆ* we have been indebted to that by Mr. N. E. Brown in the same work, which has helped us properly to understand the morphology of a very difficult but most interesting Family of plants. We wish also to mention that much assistance was derived from the account of the Family and its Western India genera given by Dr. T. Cooke, C.I.E., in Vol. II. of his 'Flora of the Presidency of Bombay.'

#### ANALYSIS OF THE TRIBES.

- Pollen granular, loosely contained in the more or less spathulate or bifid appendices, not attached to the latter .. I. *PERIPLOCEÆ*.  
 Pollen united into very minute waxy masses, 4 or 2 of which are sessile upon a very minute quadrate pale-coloured pollen-carrier .. II. *SECAMONEÆ*.  
 Pollen united in waxy opaque masses without pellucid margin, usually of fair size and attached in pairs by caudicles to the dark-coloured pollen-carriers :—  
     Pollen-masses pendulous .. .. III. *CYNANCHEÆ*.  
     Pollen-masses erect or horizontal, very rarely pendulous .. IV. *MARSDENIÆ*.  
 Pollen united in waxy masses pellucid on one margin or at the apex, and attached in pairs by caudicles to the pollen-carriers V. *CEROPEGIÆ*.

#### Tribe I. *PERIPLOCEÆ*.

Filaments of the stamens free; anthers acute or with the connectives produced in terminal appendages connivent over the style-apex and frequently connate. Pollen-contents of each anther-cell of numerous loose granules, each granule formed of 3 to 4 pollen-grains united in lines or tetrads. Appendices spathulate, trumpet-shaped or trowel-shaped, sometimes bipartite, horny, attached by short or long caudicles to an adhesive pollen-carrier gland at the base, which is itself attached to the angles of the style-apex, holding the pollen-granules loosely but not attached to them.

Corona-processes none :—

Anthers with long appendages; climbers :—

    Anther appendages erect, thick, curving inwards at tip .. 1. *PHYLLANTHERA*.

    Anther appendages erect, bearded, erect at tip .. 2. *PENTANURA*.

Anthers with short appendages curving over the style-apex;

shrubs .. .. 3. *GONGYLOSPERMA*.

Corona-processes 5 :—

Corona-processes short, thick .. .. 4. *HEMIDESMUS*.

Corona-processes filiform, behind the stamens :—

Stamens without alternating glands between the filaments;

corolla-lobes rounded :—

    Follicles short, broad, ribbed; corolla large .. 5. *FINLAYSONIA*.

    Follicles cylindric, narrow, not ribbed; corolla small .. 6. *GYMNANTHERA*.

Stamens with glands between the filaments :—

Corolla-lobes elongate, linear-lanceolate; anther appendages long, narrow .. .. 7. *ATHERANDRA*.

Corolla-lobes short, ovate; anther appendages short, thick 8. *STREPTOCAULON*.

## 1. PHYLLANTHERA, Blume.

Glabrous climbing shrubs. *Leaves* opposite, with nerves at right angles to the midrib, pale beneath. *Flowers* long-pedicelled, subracemose, reddish, in lax pedunculate cymes from one axil of a pair of leaves. *Calyx* short, 5-fid; lobes ovate; scales 5, alternate with the lobes within, membranous. *Corolla* campanulate-rotate, fleshy, deeply 5-fid, papillose within; lobes suboblique, concave, overlapping to the right. *Corona* none. *Stamens* affixed near the base of the corolla; filaments free; anthers agglutinated with the style-apex, not bearded; appendages erect, thick, naked, curving inwards at the tip. *Pollen* granular, composed of 3 to 4 granules cross-wise adherent; pollen-carriers globose, bearing short slender caudicles ending in obliquely funnel-shaped appendices which carry the pollen-masses. *Style-apex* capitate, obscurely 5-angled. *Fruit* of 2 slender divaricate follicular mericarps. *Seeds* oblong; testa thin, with few silky hairs ending in a tufted long silky coma; albumen thin; cotyledons oblong; radicle cylindric, nearly as long as the cotyledons.—DISTRIB. Species 2, one of the Malay Peninsula, the other of Java.

PHYLLANTHERA PERAKENSIS, King & Gamble, n. sp. A glabrous slender climbing shrub, with thin slender terete branchlets. *Leaves* somewhat fleshy, membranous when dry; oblong or oblong-lanceolate, acuminate at apex, rounded at base; glabrous on both surfaces, the lower pale, almost glaucous; margins recurved; 2·5 to 4 in. long, .75 to 1·25 in. broad; midrib prominent, impressed above, raised beneath; main nerves 8 to 10 pairs at right angles to the midrib, obscure, slender, straight to join an intramarginal looped nerve at the sinus of the loops; secondary nerves very few, between and parallel to the main nerves, very obscure; reticulations not visible; petiole slender, .25 to .5 in. long, slightly thickened below. *Cymes* few-flowered; peduncles slender, up to about .25 in. long; branches usually 2, reaching .5 in. in length, subracemose, with pairs of persistent small ovate acute scarious bracts; pedicels very slender, about .25 in. long; buds globose; flowers reddish-brown or mottled red and yellow. *Calyx*-lobes ovate, hyaline, .05 in. long; scales .1 to .2 in. long, membranous. *Corolla*-lobes orbicular, imbricate, .2 to .3 in. long, minutely papillose within; tube very short. *Anthers* with appendages .05 to .075 in. long. *Follicles* slender, 6 to 7 in. long, .25 in. broad, the tip hooked inwards, divaricate in one straight line; pericarp smooth, thin, dark brown, striate. *Seeds* many, oblong, ridged on the ventral surface, .3 in. long, .06 in. broad, with a few sparse white hairs and a deciduous silky white spreading coma 1·5 to 2 in. long; testa thin, dark brown; albumen very thin; cotyledons oblong, rather fleshy, .15 in. long, .05 in. broad; radicle cylindric, .1 in. long.

PERAK : at Kota, Wray 2407, 3005 ; *Scortechini* ; at Larút, King's Collector 2059, 2181, 7314.

This species comes very near to the Javanese *P. bifida*, Blume, but the latter has narrower and longer leaves, with very many (20 to 25) pairs of main nerves and many secondary ones with the intramarginal nerve much nearer the margin. The peduncles and branches of the cyme and the pedicels are stouter and longer and the corolla more fleshy. The anthers are similar, but the pollen-carrier appendices are more obliquely funnel-shaped (see t. xxii. in Bl. Mus. Bot. Lugd.-Bat. I.). The only specimen in the Kew Herbarium is "Coll. T. Lobb, India 1868," and may be possibly from the Peninsula. In the Calcutta Herbarium are specimens from Sumatra (*H. O. Forbes* 2436).

## 2. PENTANURA, Blume.

Glabrous climbing shrubs. *Leaves* opposite, with nerves at right angles to the midrib or nearly so. *Flowers* 1 to 3, on bracteate pedunculate racemose cymes in the axils of or opposite to one leaf of the pair. *Calyx* small, 5-fid, with 5 membranous scales alternate with the lobes within. *Corolla* campanulate-rotate, fleshy, deeply 5-fid, papillose within ; lobes oblong, concave, overlapping to the right. *Corona* none. *Stamens* affixed near the base of the corolla, the bases distant, geniculate ; filaments free ; anthers agglutinated with the style-apex, oblong, not bearded ; appendages lanceolate, bearded, caudiform, erect at tip. *Pollen* granular, composed of 3 to 4 granules cross-wise adherent pollen-carriers discoid, bearing slender caudicles and spatulate often truncate appendices which carry the pollen-masses. *Style-apex* capitate, sharply 5-angled. *Fruit* of 2 slender divaricate follicular mericarps. *Seeds* oblong, with few silky hairs ending in a tufted long silky coma ; testa thin ; albumen thin ; cotyledons oblong ; radicle cylindric.—**DISTRIB.** Species 2, one of the Khasia Hills and Yunan, the other of the Malay Peninsula and Archipelago.

This genus comes very near to *Phyllanthera*, with which we are inclined to think it might be incorporated. It differs in the markedly pentagonal style-apex, the bearded anther appendages, and the spatulate not funnel-shaped appendices of the pollen-carriers. *P. khasiana*, Kurz, Fl. Br. Ind. IV. 4, hardly seems to us to belong to this genus.

PENTANURA SUMATRANA, Blume Mus. Bot. Lugd.-Bat. I. 125, t. xxi. (1849). A glabrous slender climbing shrub, with thin angled or striate branchlets, bearing occasional round lenticels. *Leaves* chartaceous ; elliptic, rather abruptly acuminate at apex, cuneate at base ; glabrous on both surfaces, the lower pale, almost glaucous ; the margins strongly recurved ; 3 to 4 in. long, 1.25 to 1.75 in. broad ; midrib slender, slightly impressed above, raised beneath ; main nerves 7 to 8 pairs, slightly raised beneath, at or a little less than right angles with

the midrib, straight to join an intramarginal looped nerve; secondary nerves few, very faint; reticulations not visible; petiole .25 in. long, channelled above, sometimes bearing small stipular glands at the base. *Racemes* up to 2 in. long, 1- to 3-flowered, with pairs of persistent ovate scarious bracts; pedicels slender, .15 in. long; buds ovoid, acute; flowers deep red. *Calyx*-lobes ovate, acute, hyaline, .1 in. long, with ovate acute membranous scales .03 in. long between each at the base within. *Corolla*-lobes oblong or obovate-oblong, .5 in. long by .3 in. broad, minutely papillose within; tube salver-shaped at base. *Appendages* of stamens erect, bearded, about .03 in. long; appendices of pollen-carriers as long. *Follicles* slender, 5 to 6 in. long, .2 in. broad, very acute, divaricate in a straight line, tips straight; pericarp thin, rough, striate, dark brown. *Seeds* many, oblong, ridged on the ventral surface, .275 in. long, .075 in. broad, with a few sparse white curly hairs and a deciduous silky white spreading coma about 1.5 in. long; testa thin, dark brown; albumen thin; cotyledons oblong .15 in. long by .05 in. broad; radicle cylindric, .1 in. long. Miq. Fl. Ind. Bat. II. 471; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 211, fig. 63, D.E.

PERAK: at Relau Tujur, Wray 1847, 4025; *Scortechini* 1303; *King's Collector* 1825, 3514.—DISTRIB. Sumatra (*Prætorius*, *Beccari* 640).

### 3. GONGYLOSPERMA, King & Gamble, nov. gen.

A shrub. *Leaves* opposite, strongly nerved. *Flowers* in axillary or pseudo-terminal, bracteate, paniculate cymes; the branches 2- to 3-photomous; pedicels slender. *Calyx* short, 5-partite: scales combined in a ring. *Corolla* rotate-campanulate; the tube short; lobes oblong, overlapping to the right. *Corona* none. *Stamens* inserted on the corolla-tube; filaments free, broad and nearly confluent at base; anthers short; appendages short, triangular, incurved over the style-apex; pollen-granules elongate, of 3 to 4 pollen-grains in one line; pollen-carriers minute, appendices spatulate. *Ovary* of 2 carpels; styles distinct below, combined above; style-apex obscurely 5-angled, flattened at top. *Fruit* of 2 short divaricate oblong follicular mericarps; pericarp thin, pubescent. *Seeds* very small, oblong-cylindric, with a white silky coma; albumen copious; cotyledons fleshy; radicle cylindric.—DISTRIB. A single species only as so far known.

GONGYLOSPERMA CURTISII, King & Gamble, n. sp. A small shrub; branches smooth, brown. *Leaves* coriaceous; lanceolate or oblong-lanceolate, acute at apex, attenuate at base; both surfaces rugose, the upper slightly puberulous, the lower pubescent, both ashy grey, the lower much the paler; margins recurved; 2.5 to 4.5 in. long, .75 to 1.75



in. broad; midrib as well as all nerves and reticulations impressed above, raised beneath; midrib thick; main nerves stout, 18 to 20 pairs, at about  $60^\circ$  with the midrib, nearly straight to join an obscure intra-marginal looped nerve close to the margin; secondary nerves few; reticulations closely netted; petiole rather stout, .15 to .25 in. long. *Cymes* more or less grey-puberulous, reaching 1.5 in. long and 2 in. broad; peduncle stout, .25 to .5 in. long; branches 3-chotomous secondary branches again 3-chotomous, both furnished with pairs of small ovate acute bracts; pedicels slender, .15 in. long; buds ovoid, acute. *Calyx* short; tube very short; lobes ovate, acute, hyaline on the margins, glandular dotted; scale-ring narrow. *Corolla*-tube short, lobes oblong, blunt, .15 in. long. *Corona* none. *Stamens* few; filaments rather thick, enlarged and almost confluent at the base; anthers short, rounded; appendages triangular, black, curved over the style-apex and connate. *Styles* short, stout; style-apex obscurely 5-angled, flattened at top. *Follicles* straight, thick, 1 to 1.25 in. long, .25 in. broad, divaricate in a straight line, tip slightly incurved, blunt; pericarp thin, minutely grey-pubescent. *Seeds* oblong-cylindric, .1 in. long and .05 in. thick, ending in a sparse white silky coma .2 in. long; testa granular, very thin; albumen copious; cotyledons elliptic, fleshy, .06 in. long; radicle cylindric, a little shorter than the cotyledons.

SIAM STATES: at Poongah, in the crevices of limestone rocks. *Curtis* 2951.

#### 4. HEMIDESMUS, Br.

Twining shrubs. *Leaves* opposite or in whorls of 4. *Flowers* small, greenish-purple, in opposite crowded subsessile cymes. *Calyx* 5-partite; lobes acuminate; with 5 minute scales between them at their bases within. *Corolla* rotate, deeply 5-fid, with valvate fleshy lobes; tube very short. *Corona*-processes 5, short, thick, on the throat of the corolla and alternate with its lobes. *Stamens* inserted at the base of the corolla-tube; filaments distinct or subconnate at the base; anthers small, cohering at the apex, terminated by inflexed appendages; pollen-masses cohering in pairs in each cell, granular; the caudicles of the pollen-carriers thick below, then slender, bearing cucullate or spreading appendices. *Style-apex* 5-lobed, flat on the top. *Fruit* of 2 slender divaricate terete follicular mericarps. *Seeds* oblong, flattened, ridged on the ventral face, ending in a broad tip bearing a long silky coma; albumen scanty; cotyledons oblong, fleshy; radicle cylindric.—  
DISTRIB. India and Malaya; species 1 or 2.

HEMIDESMUS INDICUS, Br. in Mem. Wern. Soc. Edinb. I. 57 (1811). A prostrate or twining shrub, with slender terete branchlets; older branches dark brown, with prominent wart-like lenticels. *Leaves* chartaceous, very variable, in pairs or whorls of 4, of which one pair shorter than the other; elliptic-oblong to linear-lanceolate, acute or mucronate at apex, rounded at base; glabrous on both surfaces, the upper sometimes variegated with white, the lower often pale; margins recurved; 2 to 4 in. long, .5 to .75 in. broad (our specimen); midrib slender, raised beneath or flattened; main nerves 4 to 5 pairs, curving upwards and meeting near the margin; reticulations obscure; petiole .15 to .25 in. long, slender. *Cymes* opposite, on very short peduncles; flowers on short pedicels with many ovate-acute bracts. *Calyx*-lobes ovate-acute, membranous, .05 in. long; scales minute. *Corolla*-lobes ovate-oblong, acute; tips incurved; .15 to .25 in. long. *Corona*-scales often emarginate. *Follicles* cylindric, 4 to 7 in. long, spreading at 180° apart or slightly curved backwards from the straight line; tips slightly hooked; pericarp thin, smooth. *Seeds* ovate-oblong, flattened, ridged on the ventral face; testa granulate on one side and the margin, smooth on the other; cotyledons oblong; radicle slightly shorter than cotyledons. Wall. Cat. 8243; Wight Contrib. 63, Ic. t. 594; Deless. Ic. Sel. V. t. 55; Dene. in DC. Prodr. VIII. 494; Miq. Fl. Ind. Bat. II. 465; Benth. & Trim. Med. Pl. t. 174; Hook. f. Fl. Br. Ind. IV. 5; Trimen Fl. Ceyl. III. 144; Cooke Fl. Bomb. II. 147; Prain Beng. Plants 686; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 218, fig. 63, H. J. *H. Wallichii*, Miq. Pl. Hohenack. No. 359. *Periploca indica*, Willd. Sp. Pl. I. 1251. *Asclepias pseudo-sarsa*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 39, *excl. syn.*—Burm. Thes. Zeyl. t. 83, fig. 1. "*Naru-nundi*," Rheede Hort. Mal. X. t. 34.

DINDINGS: at Bruas Road, *Curtis*.—DISTRIB. India, Ceylon.

The only specimen available was a very poor one with only one or two nearly rotten flowers, but there seems no reason to doubt its identification.

##### 5. FINLAYSONIA, Wall.

A lofty glabrous climbing shrub with milky juice. *Leaves* opposite. *Flowers* in 2- to 3-chotomous axillary cymes, moderate-sized, yellowish and purple. *Calyx* short, 5-partite. *Corolla* rotate, deeply 5-fid; the lobes broad, ovate, overlapping to the right. *Corona*-processes 5, filiform, close behind the stamens. *Stamens* inserted at the throat of the corolla; filaments slender; anthers adnate to the style-apex by the middle, ending in broad inflexed membranous acute appendages; pollen-masses cohering in pairs in each cell; pollen granular; pollen-

carriers glandular, attached to the angles of the style-apex; appendices slender, dilated above in a small rounded apex. *Style* slender; style-apex large, fleshy, truncate and 5-angled at base, convexly conical above. *Fruit* of 1 or 2 divaricate, fleshy, broad, follicular mericarps; the sides with 1 to 4 longitudinal ribs; the tip incurved. *Seeds* lax, flattened, ovate, with short rufous hairs at the margins, coma none; testa thin; albumen scanty; cotyledons broadly oblong, fleshy; radicle short, stout.—DISTRIB. India and Malaya; 1 species.

FINLAYSONIA OBOVATA, Wall. Pl. As. Rar. II. 48, t. 162 (1831), and Cat. 4466A. A lofty glabrous climbing shrub with milky juice; branches stout, obtusely angular, with pale brown papery, lenticellate bark. *Leaves* coriaceous; obovate, obtuse or shortly apiculate at apex, cuneate at base; both surfaces glabrous, the lower glaucescent; margins slightly recurved; 3 to 5 in. long, 1·5 to 2·5 in. broad; midrib broad, slightly impressed above, flattened beneath; main nerves 7 to 9 pairs, at about 70° with the midrib, straight to join in an obscure looped intramarginal nerve; secondary nerves few; reticulations many, indistinct; petiole ·5 to 1 in. long. *Cymes* 2 to 3 in. long; peduncle thick, often reddish, ·75 to 1 in. long; branches divaricate, ·25 to ·5 in. long, usually 3; subsequent branches usually 2, short, stout; pedicels slender, ·15 in. long; bracts ovate, acute, sheathing the bases of the branches; buds ovoid; flowers yellowish with purple markings. *Calyx*-lobes ovate, acute, ciliate, ·05 in. long; scales very minute. *Corolla*-lobes nearly orbicular, spreading, furnished within with long whitish hairs on a part only, glabrous without, ·2 to ·3 in. long. *Corona*-processes flexuose, ·06 in. long. *Follicles* thick, ventricose, about 3 in. long by 2 in. broad, broadest in the middle; tip thick, blunt, hooked; ribs 3 to 4, slightly winged; pericarp thin. *Seeds* ovate, ·7 to ·8 in. long by ·4 in. broad, flat; the margins winged and bordered by a few long, reddish, applied hairs, extending in a short tuft at the tip; testa thin, brown, keeled on the ventral surface; albumen thin; cotyledons oblong, fleshy, ·45 in. long, ·25 in. broad, veined; radicle thick, ·15 in. long. Wight Contrib. 65; Wight Ill. t. 182, fig. 5; Griff. Notul. IV. 70, and Ic. Pl. Asiat. t. 407; Dcne. in DC. Prodr. VIII. 494; Miq. Fl. Ind. Bat. II. 464; Hook. f. Fl. Br. Ind. IV. 7; Kurz For. Fl. II. 197; Prain Beng. Plants 686; Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 211, fig. 64, c.d. *Gurua obovata*, Ham. in Voigt Hort. Sub. Calc. 544.

SIAMESE STATES: at Kasoom, Curtis 3246. PENANG: at Butterworth, Curtis 483. PERAK: *Scortechini* 1104. SELANGOR: among mangroves at Kwala Selangor, Ridley 7565. MALACCA: *Maingay* (K.D.) 1104. SINGAPORE: Ridley.—DISTRIB. India (Sundarbans), Burma (*Griffith*, *Helper* 3749). A plant of the river deltas.

The description of Wallich is most detailed, and, it may be mentioned here, gives a brief account of Mr. George Finlayson, in whose honour the genus was named.

## 6. GYMNANTHERA, Br.

Glabrous climbing shrubs. *Leaves* opposite. *Flowers* in short axillary peduncled cymes, usually 2-branched; branches racemose pedicels slender. *Calyx* short, 5-partite, with 5 or 10 or more minute membranous scales within at the base. *Corolla* hypocrateriform or rotate; the lobes spreading, overlapping to the right. *Corona*-processes 5, filiform on a broad base, often bifid, affixed to the corolla-tube closely behind the stamens and subconnate with them. *Stamens* inserted in the tube of the corolla; filaments short, slender above, dilated at the base and subconnate; anthers adherent to the style-apex, produced above in acuminate connivent appendages; pollen granular, in several masses in each anther-cell; the granules elongate, of 3 to 4 grains lineally arranged; pollen-carriers large, glandular; caudicles slender, appendices spathulate, carriers attached to the style-apex. *Style* short; style-apex convex, 5-lobed at base. *Fruit* of 2 cylindric divaricate follicular mericarps. *Seed* not known.—DISTRIB. About 5 species: of the Malay Archipelago and tropical Australia.

GYMNANTHERA INSULARUM, King & Gamble, n. sp. A climbing shrub; branches woody, thick, rough, with dark brown smooth bark and occasional lenticels. *Leaves* chartaceous; elliptic or elliptic-oblong, rounded with a short acumen at apex, attenuate at base; upper surface dark brown when dry, lower greyish-white, both surfaces glabrous; margins slightly recurved, 2·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib prominent, pale, impressed above, raised beneath; main nerves 12 to 14 pairs, at about 70° with the midrib, slightly curved upwards to join a faint intramarginal looped nerve; secondary nerves faint, short; reticulations netted, impressed above when dry; petiole slender, .5 to .75 in. long, channelled above. *Cymes* puberulous, about as long as the petiole; peduncle short, .2 in. long; branches 2, racemose, with many pairs of minute, ovate, acute bracts; pedicels rather stout, .15 in. long; buds ovoid. *Calyx* very small; lobes scarcely .025 in. long, margins hyaline; scales very small, 5 opposite to and 5 alternate with the lobes. *Corolla*-tube very short; lobes ovate-oblong, acute, .15 to .2 in. long, slightly overlapping to the right, reflexed in flower. *Corona*-processes 5, behind the filaments, bifid; the lobes subulate, inner one the longer, .03 in. long. *Stamens* inserted on the corolla-tube; filaments slender, broadened and connected at base; anthers rounded; connective produced in an acuminate tip; pollen granular, in many masses, each made up of 3 to 4

grains adherent lineally. *Style* short, rather slender; style-apex 5-angled below, convex above. *Fruit* and *seeds* not known.

KEDAH: small islands near Langkawi, *Curtis* 3684.

#### 7. ATHERANDRA, Dene.

Slender glabrous climbing shrubs. *Leaves* opposite. *Flowers* in lax axillary and terminal peduncled dichotomous cymes. *Calyx*-tube turbinate, 5-partite, patent in end; scales 5, quadrate, crenulate. *Corolla* rotate; tube short, narrowed at the base; lobes elongate, slender, linear-lanceolate, overlapping to the right, twisted to the left in end. *Corona*-processes 5, filiform, at the back of the bases of the filaments. *Stamens* inserted at the base of the corolla-tube; filaments free, alternate with erect glands; anthers ovate, subhastate at base, connate with the style-apex; appendages long, acute, membranous, combined in a cone over the style-apex; pollen-carriers of a viscid basal gland attached to the base of the style-apex; appendices oblong-spathulate, bearing many pollen-granules of 4 grains arranged in line or in tetrads. *Ovary* conical, sunk in the calyx-tube; style slender, short; style-apex long, conical, 5-lobed at base. *Fruit* not known.—DISTRIB. One species.

ATHERANDRA ACUTIFOLIA, Dene. in DC. Prodr. VIII. 497 (1844). A slender twining shrub; branchlets dark brown, slightly rough; innovations puberulous. *Leaves* chartaceous when dry; oblong-lanceolate or obovate-oblong, acute or cuspidate at apex, attenuate and then rounded at base; glabrous on both surfaces and reddish or greyish black when dry, dark on the upper, almost glaucous on the lower; margins slightly recurved; 2 to 3.5 in. long, .75 to 1.75 in. broad; midrib slender, raised beneath, sometimes puberulous; main nerves 5 to 8 pairs, very slender, arching upwards to and along the margin; secondary nerves few, reticulations inconspicuous; petiole slender, .2 to .4 in. long. *Cymes* very slender, reaching 3 in. in length and about the same in breadth; peduncles slender, about 1 in. long; branches capillary, nearly as long; bracts in pairs, linear-subulate, .1 to .15 in. long; pedicels capillary, curved, .75 in. long, somewhat enlarged under the calyx; buds conical, acuminate, .5 in. long; flowers few, brownish-yellow, distant. *Calyx*-tube turbinate, with 5 small scales at the throat; lobes spreading, lanceolate, .06 in. long. *Corolla*-tube very short; lobes linear, .75 in. long, twisted in bud to the right, then straight, recurved in flower. *Corona*-processes filiform, nearly .1 in. long, behind the stamens. *Fruit* and *seeds* not known. Miq. Fl. Ind. Bat. II. 467; Hook. f. Fl. Br. Ind. IV. 9. *A. pubescens*, Blume Mus. Bot. Lugd.-Bat. I. 147, t. xxvi; Miq. l.c. 468. *A. cuspidata*, Blume l.c.; Miq. l.c. *Cryptolepis filiformis*, Wall. Cat. 4458.

KEDAH : at Coah, Langkawi Island, *Curtis* 2591. PENANG : *Wallich* 4458.—DISTRIB. Java (*Lobb, &c.*).

In *Curtis*' specimen the glands between the filaments are very small or sometimes none ; but otherwise the specimen agrees well enough with *Wallich*'s.

#### 8. STREPTOCAULON, Wight & Arn.

Twining herbs and shrubs, usually tomentose. *Leaves* opposite. *Flowers* small, often minute, in lax sessile or peduncled trichotomous paniced cymes in one axil only of a pair of leaves. *Calyx* minute, 5-partite, with 5 scales within at the base. *Corolla* rotate; tube very short; lobes ovate, slightly overlapping to the right; buds conical or pyramidal. *Corona*-processes filiform, adnate to the backs of the filaments. *Stamens* inserted at the base of the corolla; filaments very short, alternating with minute glands; anthers oblong, adherent to the style-apex; appendages small, black, triangular, connate over the style-apex; pollen-carriers of a viscid gland attached to the base of the style-apex; appendices spathulate-funnel-shaped; pollen-masses 2 in each anther-cell composed of pollen-granules, each of which consists of 3 to 4 grains arranged in lines or tetrads. *Ovary* of 2 distinct carpels; style short; style-apex 5-angled, depressed, top convex. *Fruit* of 2 divaricate follicular mericarps, usually pubescent. *Seeds* flattened, keeled on the ventral surface, oblong; tip broad, surmounted by a long white silky coma; testa very thin; albumen very scanty; cotyledons ovate-oblong, flat; radicle cylindric, nearly as long as cotyledons.—DISTRIB. 6 to 7 species, of India and the Malay Peninsula and Archipelago, and the Philippine Islands.

Main nerves of leaf 6 to 8 pairs; corolla-lobes under .1 in. long;

follicles under 3 in. long .. .. 1. *S. Wallichii*.

Main nerves of leaf 14 to 18 pairs; corolla-lobes over .1 in.

long; follicles over 3 in. long .. .. 2. *S. Griffithii*.

1. STREPTOCAULON WALLICHII, Wight Contrib. 65 (1834). A slender climbing shrub with very milky juice; branchlets slightly angled, with dark brown bark and occasional small lenticels, uppermost and innovations densely shortly brown-pubescent. *Leaves* subcoriaceous; elliptic or elliptic-lanceolate, acute with a short apiculus at apex, euneate at base or occasionally rounded; upper surface dull brown when dry and puberulous, lower densely and softly brown-tomentose; margins slightly recurved; 2 to 5 in. long, 1 to 2.5 in. broad; midrib slender, slightly impressed above, prominent beneath; main nerves 6 to 8 pairs, at an angle of about 60° with the midrib, curved gradually upwards to

and along the margin; secondary nerves none; reticulations minutely netted but not prominent; petiole .25 to .5 in. long, channelled above. *Cymes* spreading, much-branched, many-flowered, hispidly pubescent, reaching 1.5 to 2 in. long and 2 to 2.5 in. broad; peduncles usually short, about .25 in. long; branch peduncles .5 in., rest gradually shorter; bracts many, in pairs, small, ovate-acuminate; pedicels slender; buds ovoid-pyramidal; flowers glabrous, reddish. *Calyx*-tube turbinate; lobes ovate-oblong, .025 in. long, often emarginate, hyaline at the edges; scales minute, obtuse. *Corolla*-tube very short, cylindric, then rotate; lobes oblong, .075 in. long, obtuse, tips incurved. *Corona*-processes .03 in. long, tips glandular. *Follicles* slender, 3 in. long, .3 in. broad, divaricate in a straight line, tips slightly hooked; pericarp thin, densely greyish-tomentose. *Seeds* oblong, rounded at base, keeled on the ventral surface, .25 in. long by .05 in. broad, broad at tip and with a thick white silky coma 1 to 1.25 in. long; testa thin, brown, shining; albumen very scanty; cotyledons ovate-oblong, acute, .1 in. long; radicle slender, cylindric. Wall. Cat. 8249B; Dcne. in DC. Prodr. VIII. 496; Miq. Fl. Ind. Bat. II. 469; Hook. f. Fl. Br. Ind. IV. 9.

KEDAH: on Lankawi Island, *Ridley* 8295; *Bell in Cantley* 229. KELANTAN: *Ridley* cf. Trans. Linn. Soc., Ser. 2, III. 320. PENANG: *Phillips*; *Maingay* (K.D.) 1100; *Deschamps*; *Stoliczka*; *G. King*; *Curtis* 472, 2122; *Ridley* 9484; *King's Collector* 4910, 5188. PROVINCE WELLESLEY: at Arakuda, *Ridley* 6972. PERAK: *Scortechini*; *King's Collector* 2509; *Ridley* 3072. SINGAPORE: *Wallich* 8249B.

2. STREPTOCAULON GRIFFITHII, Hook. f. Fl. Br. Ind. IV. 10 (1883). A climbing shrub; branchlets dark purplish-brown, pubescent; innovations hispidly tomentose. *Leaves* subcoriaceous; obovate-oblong or oblanceolate, shortly acuminate at apex, narrowed and finally rounded or cordate at base; upper surface greyish and puberulous, lower densely greyish-brown-tomentose; margin slightly reflexed; 3 to 4 in. long, 1 to 2 in. broad; midrib stout beneath, more slender and impressed above; main nerves 14 to 18 pairs, at about 60° with the midrib, at first straight, then curved to and along the margin; secondary nerves none; reticulations minutely netted, the larger ones transverse between the main nerves, all slightly impressed above and raised beneath; petiole .25 in. long. *Cymes* dichotomous, hispidly tomentose, 1 to 2 in. long and broad; peduncle .25 in. long; branches furnished with many pairs of opposite persistent ovate-acute hirsute bracts; petiole slender, .15 in. long; buds ovoid-conic. *Calyx*-tube turbinate; lobes ovate-acute, hirsute without, glabrous within; margins hyaline; scales minute, 2- to 3-fid. *Corolla*-tube very short or none; lobes rotate, ovate-acute, .1 to .15 in. long, glabrous but minutely puncticulate without. *Corona*-

processes filiform, on a conical base in a discoid ring. *Pollen-carrier* appendices broadly linear, bifid. *Follicles* slender, straight, 3 to 4 in. long, .5 in. broad, recurved to about 270°; tips slightly hooked; pericarp chartaceous, minutely pubescent without, smooth within. *Seeds* oblong, contracted above in a short neck, truncate at tip, also at base, keeled on the ventral surface, .3 in. long, .1 in. broad; tip with a dense white silky coma about 1 in. long; testa thin, black; cotyledons ovate, acute, .125 in. long; radicle slender, cylindric .075 in. long. *Streptocaulon*, Griff. Notul. IV. 71, and Ic. Pl. Asiat. t. 406.

JOHORE: at Batu Pahut, *Ridley* 11120.—DISTRIB. Burma (Tenasserim, *Helper* (K.D.) 3754; Mergui, *Griffith*), Siam (*Schomburgk*), Tonkin.

## Tribe II. SECAMONEÆ.

Filaments of the stamens connate into a tube and adnate at top to the dilated part of the style; appendages of the anthers more or less fimbriate. Pollen-contents of each anther-cell of two very minute distinct waxy masses sometimes combined into one. Pollen-carriers minute, subquadrate, soft; the pollen-masses attached to them in fours or pairs.

Corolla-lobes imbricate, usually glabrous or merely puberulous within:—

Corolla-tube not lined by a toothed membrane; corona thin:—

Corolla-lobes small, overlapping to right or left; style-apex short, rounded, obtuse; pollen-masses in fours on a minute carrier .. .. . 9. SECAMONE.

Corolla-lobes overlapping to left, usually rather large; style-apex elongate, conical or clavate; pollen-masses in pairs (or very obscurely only in fours) on a minute thick carrier. 10. TOXOCARPUS.

Corolla-tube lined by a toothed membrane; corona short, thick .. .. . 11. GONIOSTEMMA.

Corolla-lobes valvate, villous within .. .. . 12. GENIANTHUS.

## 9. SECAMONE, Br.

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. *Flowers* small, often minute, in lax axillary sessile or shortly peduncled 2-3-chotomous cymes. *Calyx* 5-partite, without scales within. *Corolla* small, rotate, 5-lobed; lobes overlapping to right or left; tube very short. *Corona*-processes 5, adnate to the staminal-column, compressed. *Stamens* inserted at the base of the corolla; filaments connate at the base only; anther-tips ending in a small inflexed appendage, connivent around the style-apex; pollen-masses very minute, globose or slightly oblong, in pairs in each cell, attached in fours to the minute pollen-carriers, without caudicles. *Ovary* of 2 carpels; style columnar,



dilated, ending in a flattened ring and produced in a beak above it; style-apex rounded or bifid, exerted beyond the anthers. *Fruit* of 2 divaricate follicular mericarps, terete or angular, acuminate, smooth. *Seeds* flattened, oblong, ending in a long white silky coma; albumen scanty; cotyledons linear-oblong; radicle rather long, cylindric.—**DISTRIB.** Species about 30, chiefly of South and Tropical Africa and the Mascarene Islands; a few in India, Malaya, and the islands, extending to Australia.

**SECAMONE MICRANTHA**, Dene. in DC. Prodr. VIII. 501 (1844). A small climbing shrub; branchlets slender, terete, the size of a crow-quill; nodes enlarged. *Leaves* membranous; ovate-lanceolate, acuminate and apiculate at apex, attenuate at base; both surfaces olive-green when dry, the lower paler, glabrous; margins recurved; 1·5 to 3 in. long, ·35 to 1 in. broad; midrib slender; main nerves about 8 to 10 pairs, obscure, curving acutely upwards to meet an obscure intramarginal nerve; reticulations scarcely visible; petiole slender, 1 to ·25 in. long. *Cymes* spreading, pubescent, 1 to 2 in. long and the same broad; branches usually 2-chotomous below, 3-chotomous above; main peduncle variable, reaching 1 in. long; branch peduncles slender, flexuous, often zigzag, about ·25 in. long; pedicels ·1 in.; bracts very small, ovate-acute, hispidly hairy; buds globose; flowers pale yellow. *Calyx* deeply cleft, lobes ovate, ciliate on the margins, scarious above, black-gland-dotted on the claw, ·05 in. long. *Corolla*-lobes deeply cleft, glabrous, ·075 in. long, obtuse, 3-nerved. *Corona*-processes very narrow, compressed, with a rounded tooth on the back. *Follicles* 2, slender, divaricate in a straight line (180°) or nearly so, 3 in. long, ·3 in. broad; acuminate tips slightly incurved; pericarp thin, glabrous, striate. *Seeds* ovate-spathulate, truncate at tip, flattened, submembranous on the margins, bearing a copious white silky coma, ·5 in. long, ·125 in. broad; testa thin, brown, shining. Miq. Fl. Ind. Bat. II. 472. *Tylophora micrantha*, Dene. Herb. Tim. Desc. in Nouv. Ann. Mus. Sc. III. (1834) 377.

**SIAMESE STATES:** Trang, *King's Collector* 1414. **KEDAH:** on Langkawi Island, *Curtis* 2800. **PENANG:** *Curtis* 225, 992, 1896.—**DISTRIB.** Java, Timor.

We cannot separate from this *S. Finlaysonii*, Wight Contrib. 61 (1834); Wall. Arch. No. 103, probably from Siam.

#### 10. TOXOCARPUS, Wight & Arn.

Twining shrubs. *Leaves* opposite. *Flowers* small or moderate-sized, in axillary dichotomous paniculate or racemose cymes. *Calyx* minute, 5-partite, with or without 5 minute scales within at the base.

*Corolla* shortly subrotate or campanulate, 5-fid; tube short or about as long as the lobes; lobes linear-oblong, recurved, overlapping to the left. *Corona*-processes 5, attached to the staminal tube, dorsally flattened, toothed, the tooth usually curving upwards. *Stamens* inserted at the base of the corolla; filaments connate; anthers small, erect or connivent around the style-apex; appendages often minutely fimbriate; pollen-masses very minute, pendulous, single or obscurely in pairs in each cell, attached to minute pale soft pollen-carriers, without caudicles. *Ovary* of 2 carpels; style slender; style-apex columnar or clavate, produced far beyond the anthers; tip often bifid. *Fruit* of 2 divaricate follicular mericarps; pericarp smooth. *Seeds* oblong, flattened, tipped with a silky coma; testa thin; cotyledons oblong; radicle cylindric.—DISTRIB. Species about 20; found in India, Malaya and Tropical Africa.

Corolla-tube much shorter than the lobes:—

Corolla-lobes linear, twisted when open; style-apex long-acuminate:—

Cymes reaching 2 in. in length; leaves more or less elliptic; follicles 12 in. long and slender .. .. 1. *T. Griffithii*.

Cymes scarcely reaching .5 in. long; leaves more or less obovate; follicles linear-lanceolate, .4 in. long .. 2. *T. Curtisii*.

Corolla-lobes obovate-oblong, not twisted; style-apex pyramidal form:— 3. *T. Scortechinii*.

Corolla campanulate; tube longer than lobes:—

Cymes rusty-pubescent, reaching 2 in. long; leaves lanceolate 4. *T. penangianus*.

Cymes pubescent, under 1 in. long; leaves elliptic .. 5. *T. lankawiensis*.

1. *TOXOCARPUS GRIFFITHII*, Dcne. in DC. Prodr. VIII. 505 (1844). A slender climbing shrub; branchlets slender, more or less hispid with purplish-brown stiff hairs; nodes swollen. *Leaves* chartaceous; elliptic-oblong or lanceolate, cuspidately acuminate at apex, cuneate at base; both surfaces glabrous except the midrib and main nerves beneath, upper greyish-brown, lower greyish when dry; margins recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib slender, slightly impressed above, raised beneath; main nerves 6 to 7 pairs, curving upwards to and along the margin where they anastomose; secondary nerves few; reticulations irregular, fairly prominent beneath when dry; petiole slender, twisted, .3 to .5 in. long. *Cymes* shorter than the leaves, reaching 2 in. in length, rusty-pubescent; peduncle about .25 in. long; branches 2 to 3, racemosely paniculate; the flowers in small clusters on a somewhat zigzag red rachis; bracts many, persistent, ovate-acute; pedicels very short; buds conical; flowers creamy white. *Calyx* pubescent without; lobes ovate-oblong, .05 in. long. *Corolla*-lobes linear-oblong, glabrous except for slight pubescence near

the base within, .075 in. long, twisted; tube very short. *Corona*-processes adherent to and as long as the staminal tube, the back with a short upturned tooth. *Style-apex* produced, ovate-clavate, acuminate and bifid at tip. *Follicles* 12 in. long, .15 in. broad, very slender, flexuous, slightly torulose; pericarp crustaceous, puberulous. *Seeds* 1 in. long, linear, very slender, obliquely truncate at apex and furnished with a thick coma of silky hairs 1 to 1.25 in. long; testa dark brown, granular; cotyledons oblong, thin. Hook. f. Fl. Br. Ind. IV. 13. *Toxocarpus* sp., Griff. Notul. IV. 69, and Ic. Pl. Asiat. t. 404 (*Asclepiadææ*). *Connaracea*, Wall. Cat. 8550.

PENANG: *Porter*. PERAK: at Sungie Larút, *Wray* 2465; in dense jungle on low wet ground near Larút, *King's Collector* (*Kunstler*) 6205. MALACCA: *Maingay* (K.D.) 1105. SINGAPORE: *Lobb* 45.—DISTRIB. Burma (in *Mergui*, *Griffith* 8550; *Helper* 3758).

2. *TOXOCARPUS CURTISII*, King & Gamble, n. sp. A slender climbing shrub; branchlets pustular, dark brown, striate, the uppermost rusty-pubescent, nodes slightly swollen. *Leaves* elliptic or elliptic-obovate, shortly and bluntly acuminate at apex, cuneate at base; both surfaces olive-grey, upper darker and shining, lower sparsely rusty-pubescent when young; margins recurved; 2 to 3.5 in. long, 1.25 to 2 in. broad; midrib prominent, impressed above, raised beneath; main nerves distant, 4 to 8 pairs, starting at an angle of 60° with the midrib and arched upwards to join in an intramarginal looped nerve as prominent as themselves and like them raised beneath; secondary nerves few, obscure; reticulations irregular; petiole .2 to .5 in. long, slender, twisted. *Cymes* axillary, tawny-pubescent, sessile or on very short peduncles; branches 2 to 3, subracemose; the flowers in bracteate clusters; bracts small, lanceolate; pedicels short; buds conical, acuminate. *Calyx* thickly rusty-pubescent without; lobes ovate-acuminate, .05 in. long; scales alternate with the lobes, very minute or 0. *Corolla* glabrous on both surfaces; tube short; lobes linear-ligulate, twisted, much spreading, .2 in. long. *Corona*-processes acute, longer than the staminal-column, each with a short ascending tooth on the back. *Style-apex* lanceolate-conical, acuminate, with a flattened ring at its base. *Follicles* linear-acuminate, recurved at tip, 4 in. long, .3 in. broad, recurved to nearly 3 right angles apart; pericarp smooth, thin. *Seeds* oblong, flattened, .5 to .6 in. long, .15 in. broad, shortly beaked and then broadening at the base of the soft white silky coma which is 1.5 in. long; testa thin, dark brown.

KEDAH: Langkawi Island, *Curtis* 3787. PERAK: in dense jungle at 2000 to 3000 ft., *King's Collector* 8150.

3. *TOXOCARPUS SCORTECHINII*, King & Gamble, n. sp. A climbing

shrub; branchlets brown, striate, with purplish-brown rather stiff pubescence. *Leaves* coriaceous when old, almost membranous when young; ovate-oblong or ovate, acuminate at apex, acute at base; both surfaces olive-green when dry, rather dull, lower paler, glabrous except on the midrib beneath; margins recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib prominent on the lower, impressed on the upper, surface; main nerves 7 to 8 pairs, pale, raised on the lower surface, starting at an angle of 50° with the midrib and curving upwards to meet in a looped intramarginal nerve; secondary nerves few; reticulations irregular, prominent on the lower surface; petiole .3 to .5 in. long, rusty-pubescent. *Cymes* axillary, sessile, densely clothed as in the calyx with purplish-brown pubescence, reaching .75 to 1 in. long; branches few, few-flowered; bracts minute, deciduous; pedicels about .1 in. long, thick; buds oblong; flowers rather large. *Calyx*-lobes ovate-oblong, glabrous within, .1 in. long; scales 0 or minute, alternate with the lobes within. *Corolla*-tube short, .1 to .2 in. long; lobes obovate-oblong, glabrous, .35 to .5 in. long, spreading in flower. *Corona*-processes flat, truncate, much shorter than the anthers when young, when older furnished with an erose tip as long as the anthers, minutely gland-dotted. *Style*-apex pyriform-clavate, .1 in. long; the tip conical, bifid, in acuminate lobes. *Follicles* 3 in. long, .4 to .5 in. broad, cylindric, acute; pericarp smooth, thick, brown. *Seeds* ovate, flattened, with a shining margin, .6 in. long, .25 in. broad; testa brown, thin.

PERAK: *Scortechini* 630; at Larut Hill, 3000 ft., *Derry* (*Curtis* 2706).

The leaves in the two specimens seem at first to differ considerably, but the flowers agree and we believe the difference is merely due to *Scortechini*'s leaves coming from a much older plant.

4. *TOXOCARPUS PENANGIANUS*, King & Gamble, n. sp. A slender twining shrub; branchlets pale brown, striate, hispid with ferruginous-brown hairs. *Leaves* chartaceous; lanceolate or oblanceolate, cuspidately acuminate at apex, acuminate-cuneate at base; nearly black, shining and glabrous except on the midrib on the upper surface, pale and glabrous on the lower, except on the midrib or main nerves; margins recurved; 3.5 to 4.5 in. long, 1 to 1.25 in. broad; midrib stout, impressed above, raised beneath; main nerves 6 to 8 pairs, irregular but usually at an angle of about 50° with the midrib, slightly curved to meet an intramarginal looped nerve; secondary nerves few; reticulations irregular, prominently netted on the under surface; petiole .25 to .35 in. long, bordered by the narrow decurrent margin of the blade, densely rusty-pubescent. *Cymes* slender, rusty-pubescent, divaricate, reaching 2 in. in length and about 4 in. in breadth, sessile or very shortly

pedunculate; branches usually dichotomous, slender, bearing clusters of flowers at rather long intervals; bracts minute, subulate; pedicels 0 to .1 in. long; buds conical; flowers reddish-brown. *Calyx* hispidly rusty-pubescent; lobes ovate-acute or rounded, .05 in. long, gland-dotted. *Corolla* campanulate; tube as long as lobes; lobes ovate, margins incurved, .1 in. long, shortly villous within. *Corona*-processes very small, as long as anthers, bifid at apex. *Style-apex* columnar, clavate when young. *Fruit* not known.

PENANG: at Moniot's road, *Curtis* 2303.

5. *TOXOCARPUS LANKAWIENSIS*, King & Gamble, n. sp. A slender twining shrub; branchlets thin with brown bark. *Leaves* chartaceous; elliptic, shortly cuspidate-acuminate at apex, rounded at base; both surfaces greyish-green when dry, glabrous except along the midrib beneath; margins slightly recurved; 3 to 3.5 in. long, 1.75 to 2 in. broad; midrib slender, impressed above, raised beneath as are the 5 to 6 pairs of main nerves which start at an angle of 60° with the midrib and curve upwards to join in a looped intramarginal nerve; secondary nerves few; reticulations irregular; petiole slender, .25 to .3 in. long, hispid. *Cymes* axillary, sessile, pubescent, .5 to 1 in. long, corymbose; the flowers racemosely clustered on the branches; bracts persistent, minute, ovate-acute; bracteoles similar, in sheathing pairs to each very short pedicel; buds conical, about .15 in. long; flowers yellowish with purple glandular dots. *Calyx*-tube short, .05 in. long; lobes ovate-oblong, acute, ciliate, .1 in. long; scales 0. *Corolla* campanulate; tube .1 to .15 in. long; lobes triangular-acuminate, blunt, irregular, .05 to .1 in. long, pubescent within, both with glandular purple dots. *Corona*-processes adherent to the anthers and longer than them, each incurved over the style-apex and with an upturned lobe on the back. *Style-apex* columnar, on a broad annulate base. *Fruit* not known.

KEDAH: Langkawi Island, *Curtis* 2616.

# 11. GONIOSTEMMA, Wight.

Slender climbing shrubs with warted bark. *Leaves* opposite. *Flowers* in interpetiolar, lax, many-flowered, paniculate cymes. *Calyx* 5-partite; lobes rounded, with 5 glandular scales at the base within. *Corolla* campanulate-rotate; tube lined by a toothed membrane; lobes overlapping to the left. *Corona* short, thick; the 5 processes combined in a 5-lobed tube adherent to the base of the staminal-column; the lobes triangular, shorter than the column. *Staminal-column* attached to the base of the corolla-tube, fleshy, much shorter than the style; anthers slender; appendages erect around the style-apex; pollen-masses

single or in pairs in each cell attached to minute pollen-carriers without caudicles. *Ovary* of 2 carpels; style-apex 5-angled below, produced above in a long fusiform tip. *Fruit* of 2 follicular mericarps; follicles nearly parallel, thick, lanceolate. *Seeds* large, flattened, broadly winged; cotyledons elliptic, nerved; radicle cylindric.—DISTRIB. One species.

GONIOSTEMMA ACUMINATUM, Wight Contrib. 62 (1834). A slender climbing shrub; stem glabrous, pustular; branchlets with smooth brown bark. *Leaves* somewhat fleshy when green, chartaceous and wrinkled when dry; ovate-oblong, acuminate at apex, cuneate to almost rounded at base; dark green, when dry dark olive-green on the upper and pale brown on the lower surface; margins recurved; 3 to 5 in. long, 1 to 1.75 in. broad; midrib broad, conspicuous and usually pale on the upper, obscure on the lower surface; main nerves very obscure, about 10 to 14 pairs, at about 70° with the midrib, straight to join an obscure intramarginal nerve; secondary nerves many, irregular; reticulations indistinct; petiole slender, .75 to 1.25 in. long, channelled above. *Cymes* axillary or terminal, paniculately corymbose, reaching 6 to 7 in. in length and 5 to 6 in. in breadth, 2- to 3-chotomous; main peduncles slender, 1.5 to 3 in. long or sometimes 0; primary branches 1 to 2 in. long, remainder smaller by degrees; pedicels slender, .2 in. long; bracts minute, acute; flower-buds oblong, .2 to .3 in. long; flowers cream-coloured. *Calyx*-lobes orbicular, .05 in. long, ciliate on the margins, gland-dotted near the base, usually with 5 minute scales within, alternate with them. *Corolla*-lobes oblong-acute, glabrous, .15 in. long; tube .1 in. long, lined within by a membrane which ends in 5 triangular acute ciliate teeth. *Style-apex* fusiform, .1 in. long. *Follicles* thick, recurved so as to lie nearly parallel and nearly meet at the tips, which are slightly hooked; 4 to 6 in. long, .75 in. broad; pericarp smooth. *Seeds* many, flat, ovate, .75 in. long, .25 in. broad, ending in a broad flat beak, surmounted by a 2 in. long white silky coma; margins winged; testa thin, brown; albumen scanty; cotyledons oblong, 3-nerved, .2 in. long, .1 in. broad; radicle cylindric, .15 in. long. Wall. Cat. 8242; Dene. in DC. Prodr. VIII. 504. *Toxocarpus acuminatus*, Benth. in Gen. Pl. II. 747; Hook. f. Fl. Br. Ind. IV. 15.

PENANG: on Government Hill, 1000 to 1200 ft., Curtis 244; Hullett 182. PERAK: at Thaipeng and Sungie Larút, Wray 2369, 2868, 3046; clinging to trees in dense forest near Larút, King's Collector (Kunstler) 2520, 6546, 6686, 10490.—DISTRIB. India (Sylhet, Wallich 8242).

12. GENIANTHUS, Hook. f.

Twining shrubs. *Leaves* opposite. *Flowers* small, in clusters in axillary, subsimple or dichotomously branched, often racemose or spicate cymes. *Calyx* very small, 5-fid; scales 5, between the bases of the lobes within. *Corolla* rotate; tube short; lobes narrow, spreading or recurved, villous on the inner face, valvate. *Corona* of 5 often lobed processes adnate to the back of the staminal-column and often longer than it. *Staminal-column* short; anthers erect; appendages short, around the style-apex and shorter than it; pollen-masses 2 in each cell, rounded, granular, on a small curved pollen-carrier without caudicles. *Ovary* of 2 carpels; style thick; style-apex 5-angled below, tip capitate or long and slender. *Fruit* of 2 divaricate, thickened, usually obtuse, follicular mericarps; testa thickened, often tomentose. *Seeds* large, flattened, winged, with a long silky coma; cotyledons small; radicle cylindric.—DISTRIB. About 6 species, of India and Malaya.

Leaves more or less lanceolate, glabrous or nearly so beneath :—

Leaves usually under 3 in. long, shortly acuminate; cymes rarely up to 4 in. long, with close flower-clusters. . . . . 1. *G. Maingayi*.

Leaves usually over 3 in. long, long-acuminate; cymes reaching 6 in. in length, with distant flower-clusters . . . . . 2. *G. Ridleyi*.

Leaves elliptic-ovate or -obovate, ferruginous-tomentose beneath :—

Main nerves of leaves at about 50° with the midrib; follicles densely rufous-velvety . . . . . 3. *G. rufo-velutinus*.

Main nerves of leaves nearly at right angles with the midrib; follicles glabrous . . . . . 4. *G. Blumei*.

1. GENIANTHUS MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 16 (1883).

A slender climbing shrub; branchlets brown, terete, the uppermost purplish-pubescent; nodes swollen. *Leaves* coriaceous; obovate or oblanceolate, shortly acuminate at apex, cuneate at base, greyish-green when dry, the lower surface somewhat paler than the upper, both slightly pubescent when young; margins strongly recurved; 2·5 to 3·5 in. long, 1·25 to 1·5 in. broad; midrib prominent, with a gland at the base, raised on the lower, impressed on the upper surface, as are the 6 to 7 pairs of main nerves which curve upwards to join a looped intra-marginal nerve; secondary nerves few; reticulations few, irregular, rather broad; petiole ·25 to ·5 in. long, twisted. *Cymes* in pairs from the leaf-axils, up to 4 in. long, bearing clusters of sessile flowers racemously arranged; rachis angular, purplish-pubescent; bracts minute, ovate-acute; buds clavate; flowers white with a reddish tinge. *Calyx* purplish-pubescent without; lobes oblong, obtuse, ·05 in. long, with minute scales alternate with them at the base within. *Corolla*—

tube short, .025 in. long; lobes linear-oblong, obtuse, recurved in flower, covered within with yellowish villous hairs. *Corona*-processes 2-lobed, dark, longer than the staminal-column. *Style-apex* clavate, acute, .05 in. long. *Fruit* not known.

PERAK: on trees in dense jungle near Larút, *King's Collector* 5119. SINGAPORE: *Maingay* (K.D.) 1106.

2. *GENIANTHUS RIDLEYI*, King & Gamble, n. sp. A slender twining shrub; branchlets striate, with scattered round tubercles and covered with thick ferruginous pubescence. *Leaves* fleshy when fresh, chartaceous when dry; ovate-oblong or -lanceolate, acuminate at apex, rounded at base; dark olive-brown, dull and glabrous on the upper surface, pale and mottled and glabrous on the lower except along the midrib; margins recurved; 3 to 5 in. long, 1 to 2 in. broad; midrib slender, pale, raised on the lower surface, a cluster of small glands at the base; main nerves 6 to 8 pairs, pale, starting at an angle of about 70° with the midrib and curved upwards to meet in loops near the margin; secondary nerves irregular; reticulations obscure, chiefly transverse; petiole rusty-pubescent, twisted, .5 to .75 in. long. *Cymes* slender, divaricate, rusty-pubescent, racemosely paniculate, reaching 6 in. in length and 8 in. in breadth; peduncles none or short (up to .5 in. long); branches slender, the flowers in distinct clusters of about 3 to 5; bracts very small, ovate, deciduous; pedicels slender, up to about .15 in. long; buds ovoid. *Calyx*-tube short; lobes ovate-oblong, rounded, .05 in. long, glabrous within, densely ferruginous-villous without. *Corolla*-lobes free almost to the base, oblong, bluntly apiculate, recurved in flower, .15 in. long, covered in the upper half within with a dense white beard. *Corona*-processes acuminate, longer than the anthers. *Pollen*-carrier gland rounded, bifid; pollen-masses obscurely in fours. *Style-apex* columnar, .075 in. long. *Fruit* not known.

PERAK: on Maxwell's Hill, *Ridley* 2988; *Scortechini* 1172; at Larút, 3000 to 3500 ft., *King's Collector* 2612.

3. *GENIANTHUS RUFO-VELUTINUS*, King & Gamble, n. sp. A climbing shrub; branches and branchlets stout, densely clothed with soft chocolate-brown tomentum; nodes somewhat swollen. *Leaves* coriaceous; elliptic-ovate or -obovate, acuminate at apex, cuneate or attenuate or rounded at base; upper surface shining, glabrous or slightly villous, pubescent on the midrib and main nerves; lower surface ferruginous-villous, especially on the nerves, dull; margins strongly recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib stout, impressed above, as are the 7 to 9 pairs of main nerves which, leaving the midrib at an angle of about 50°, are at first straight and then curve upwards to join a rather obscure intramarginal looped nerve, also impressed; secondary nerves



few; reticulations transverse, irregular; petiole stout, .75 to 1 in. long, densely ferruginous-tomentose. *Cymes* densely ferruginous-tomentose, few-branched, on .25 to .5 in. long peduncles, reaching 4 in. long and broad; branches spicate-paniculate; the flowers in small clusters, sessile or very shortly peduncled; bracts minute, ovate-acute, deciduous; buds oblong-conical; flowers cream-coloured. *Calyx* campanulate; tube short, .025 in. long; lobes ovate, glabrous within, as long as tube; scales between them within 0 or very minute. *Corolla*-tube short, .05 in. long; lobes linear-oblong, 1 in. long, densely white-villous within. *Corona* adherent to the staminal-column below, free above and longer, each process furnished with an upturned tooth on the back. *Stamens* slender, appendages acute; pollen-carriers semicircular; pollen-masses 2 to each cell, rounded. *Style-apex* columnar, ringed at the base. *Follicles* divaricate in one straight line, cylindric, very obtuse, 4 in. long, about 1 in. broad; pericarp densely covered with chocolate-brown soft wool. *Seeds* oblong, slightly winged, .75 in. long, .25 in. broad, produced above in a short beak broad at the tip which bears a copious whitish silky coma 2 in. long; testa thin; albumen scanty; cotyledons (immature) oblong; radicle stout.

PERAK: on large trees in dense forest, *King's Collector* 5611, 6865, 6882.

4. *GENIANTHUS BLUMEI*, King & Gamble. A climbing shrub; branches stout, the size of a swan's quill, brown, rugose, lenticellate; branchlets ferruginous-tomentose. *Leaves* elliptic-ovate or -obovate, shortly acuminate at apex, attenuate when young, rounded when old at base; upper surface glabrous except on the midrib, punctulate, lower surface densely ferruginous-tomentose when young, less so when old; margins recurved; 3 to 6 in. long, 2 to 4 in. broad; midrib stout, impressed above, much raised beneath, sometimes with small glands at the base; main nerves 7 to 10 pairs, strong, lower ones nearly at right angles to the midrib, upper at about 60°, at first straight, then curved to and along the margin, impressed above; secondary nerves none; reticulations netted, obscure; petiole .5 to .75 in. long, twisted at base, tomentose. *Cymes* subsessile, lateral, up to 3 in. long; branches divaricate, bearing sessile clusters of densely tomentose small flowers; buds ovoid. *Calyx*-lobes ovate, acute, densely ferruginous-pubescent without. *Corolla*-lobes very short, white-villous within. *Corona*-processes ending in a linear-truncate ligule. *Style-apex* elongate-apiculate. *Follicles* 2, divaricate in a straight line, cylindric, obtuse; tip slightly recurved; 3 to 4 in. long, .75 in. broad; pericarp very thick, smooth, glabrous. *Seeds* ovate, .6 in. long, .3 in. broad; margin winged; tip truncate, bearing a 2 in. long pale brown silky coma; cotyledons cordate, .25 in. long; radicle cylindric, .15 in. long. *Toxocarpus Blumei*, Dene. in DC. Prodr. VIII.

506; Miq. Fl. Ind. Bat. II. 475. *Secamone macrophylla*  $\beta$ . *fulva*, Bl. Bijdr. 1050; Hassk. Cat. Bog. 125.

PERAK: at Sungie Larút, Wray 2287; *Scortechini*.—DISTRIB. Java.

There is some doubt about this species, due to the only specimen of the Java plant available being very imperfect, while both Wray's and Scortechini's specimens are in fruit only.

### Tribe III. CYNANCHEÆ.

Filaments of the stamens connate in a column if present; anthers adnate to the upper part of the style, with membranous appendages. Pollen-contents of each anther-cell united in a waxy mass; the pollen-masses opaque, attached in pairs to the pollen-carriers by short or long caudicles from which they are pendulous in the anther-cells. Pollen-carriers turgid, rarely flattened, with a dorsal suture, hard and horny, reddish-brown to black, attached at the angles of the style-apex.

Corona of 5 processes adnate to the anther-column:—

Stem erect:—

- |                                                           |                 |
|-----------------------------------------------------------|-----------------|
| Corona-processes laterally compressed, circinately curved |                 |
| at base .. .. .                                           | 13. CALOTROPIS. |
| Corona-processes cucullate with an interior horn ..       | 14. ASCLEPIAS.  |

Stem twining:—

- |                                                                                                  |                   |
|--------------------------------------------------------------------------------------------------|-------------------|
| Flowers large, fleshy; corona-processes .5 in. long, adnate to the column .. .. .                | 15. RHAPHISTEMMA. |
| Flowers small, thin; corona-processes about .1 in. long, attached to the base of the column.. .. | 16. ISCHNOSTEMMA. |
| Corona annular, adnate to the base of the column and surrounding it .. .. .                      | 17. CYNANCHUM.    |

### 13. CALOTROPIS, Br.

Erect large shrubs or small trees. *Leaves* opposite, broad, subsessile. *Flowers* medium-sized, in umbellate or subracemose pedunculate cymes, arising laterally from the stem between the bases of the leaves. *Calyx* 5-lobed; the lobes with small glandular scales at the base within. *Corolla* broadly campanulate or subrotate, divided more than half-way down in 5 broad valvate lobes which are usually reflexed in flower. *Corona* of 5 laterally compressed fleshy processes, adnate to and standing out as buttresses from the staminal-column, furnished at the base with an upcurved and involute spur, bifid at the apex or with two obtuse auricles. *Stamens* inserted at the base of the corolla; the anthers short, broad, somewhat horny at the angled wings; appendages short, broad, slightly lobed, membranous, inflexed over the style-apex; anther-cells a shallow membranous pouch; pollen-masses solitary, pendulous, flattened, spathulate, attached by slender jointed caudicles to the oblong, somewhat quadrate, pollen-carrier. *Ovary* of 2 distinct cells,

joined in a slender style bearing a depressed pentagonal style-apex. *Fruit* of 2 large, inflated, fleshy, thick, follicular mericarps. *Seeds* ovate, plano-convex, with broad apex surmounted by a coma of long slender silky hairs.—**DISTRIB.** Species 4, of Tropical Asia: in India, China, and the Malay Archipelago, one extending into Africa.

**CALOTROPIS GIGANTEA**, Br. in Ait. Hort. Kew, ed. 2, ii. 78 (1811). A large shrub, sometimes almost a small tree; branches stout, fleshy, with ash-coloured bark; branchlets covered with soft white woolly tomentum. *Leaves* somewhat leathery when green, membranous when dry; elliptic-oblong or obovate-oblong, acute at apex, cordate at base; both surfaces when young covered with very short white cottony tomentum, when old the upper glabrous, the lower glabrescent; 4 to 8 in. long, 2 to 4 in. broad; midrib broad, with a large gland at the base on the upper surface; main nerves 6 to 8 pairs, the lowest curved downwards, the rest upwards to and along the margin; reticulations few, not prominent; petiole none or extremely short. *Cymes* densely white-tomentose, on peduncles 1·5 to 4·5 in. long; branches none or few, 1 to 1·5 in. long, bearing umbels of 6 to 12 flowers on thick pedicels reaching 1 to 1·25 in. long; bracts linear-oblong, deciduous; buds ovoid, obtuse; flowers greyish-white with rose or lilac markings, 1 to 1·5 in. in diam. *Calyx*-lobes ovate-acuminate, about ·15 in. long, cottony without; glands usually about 3. *Corolla*-lobes ovate-lanceolate, acute, reflexed in flower, ·25 to ·5 in. long. *Corona*-processes ·25 to ·35 in. long, with obtuse auricles on either side near the apex and much incurved spur at the base; the keel puberulous. *Anther*-appendages 2- to 3-lobed, short, curved over the style-apex. *Ovary* and style ·35 in. long, slender; style-apex star-shaped, flat, ·15 in. broad, the umbo depressed, the horns of the star bearing the pollen-carriers. *Follicles* 3·5 to 5 in. long, oblong, broad, thick, fleshy, ventricose, pale yellow or green when fresh, recurved. *Seeds* numerous, ·25 to ·3 in. long by ·2 in. broad, broadly ovate, flattened; testa brown, narrowly margined, minutely tomentose; coma 1 to 1·25 in. long; cotyledons ovate-cordate, ·125 in. long; radicle ·05 in. long, ovate, acute. Hamilt. in Trans. Linn. Soc. XIV. 245; Wight Contrib. 53, and Ill. t. 155, 156a; Dalz. & Gibs. Bomb. Fl. 149; Brandis For. Fl. 331; Griff. Notul. IV. 68, and Ic. Pl. Asiat. t. 397, 398; Dene. in DC. Prodr. VIII. 535; Bot. Reg. t. 58; Miq. Fl. Ind. Bat. II. 481; Hook. f. Fl. Br. Ind. IV. 17; Bot. Mag. t. 6862; Kurz For. Fl. II. 200; Trimen Fl. Ceyl. III. 148; Cooke Fl. Bomb. II. 151; Prain Beng. Plants 688; Watt in Kew Bull. 1900, p. 8. *Asclepias gigantea*, Willd. Sp. Pl. 1264; Roxb. Hort. Beng. 20, and Fl. Ind. II. 30. "*Ericu*" and "*Bel-ericu*," Rheede Hort. Mal. II. 52, 56, t. 31.

PENANG: Haji Husain for Curtis. PERAK: Wray 2123 (introd.);

*Scortechini*. MALACCA: *Maingay* (K.D.) 1107. SINGAPORE: *Cuming* 2408.—DISTRIB. India, Burma, Ceylon, Malay Islands, S. China.

#### 14. ASCLEPIAS, Linn.

Perennial herbs or shrubs, often with tuberous roots, juice milky, stems usually erect. *Leaves* opposite or whorled. *Flowers* in pedunculate or sessile umbels, terminal or lateral between the leaves, usually orange-yellow, red or green. *Calyx* deeply 5-partite, with 5 to 10 glandular scales within at the base. *Corolla* rotate, deeply 5-lobed; the lobes valvate or slightly overlapping in bud, lobes usually reflexed when open. *Corona* of 5 processes arising from the staminal-column and adnate to it above; lobes erect, concave-cucullate, with usually a tooth-horn protruding from within. *Stamens* affixed to the base of the corolla; the filaments connate in a tube; anthers with a membranous appendage inflexed over the style-apex; pollen-masses pendulous, flattened, solitary in each anther-cell, attached to the hard pollen-carriers by caudicles. *Styles* free below, connected above; style-apex columnar, truncate or depressed and often umbonate at tip. *Follicles* variable, smooth or softly echinate. *Seeds* comose.—DISTRIB. Species many, chiefly of Africa and America, 2 only in Arabia and the Orient, and 2 naturalized in most warm regions.

ASCLEPIAS CURASSAVICA, Linn. Sp. Pl. I. 215 (1753). A perennial erect herb; stems 2 to 3 ft. high, pale, glabrous, smooth. *Leaves* lanceolate, acuminate at apex, cuneately acuminate at base, glabrous on both surfaces; 2·5 to 5·5 in. long, .5 to 1 in. broad; midrib slender, raised beneath; main nerves 12 to 15 pairs, irregular, curving upwards at an acute angle; reticulations not very prominent; petiole .25 to .5 in. long. *Umbels* lateral and terminal, 6- to 12-flowered; peduncles 1 to 3 in. long, puberulous; pedicels .5 to .75 in. long, puberulous; buds ovoid; flowers orange-scarlet. *Calyx*-lobes lanceolate, acute, .15 in. long, puberulous; scales minute. *Corolla* reflexed when open; lobes oblong, acute, .2 to .25 in. long, glabrous, slightly overlapping to the right in bud. *Corona*-processes arising about .1 in. above the base of the staminal-column, spathulate-cucullate, .1 to .15 in. long with a protruding horn as long as themselves arising from the base within and curved inwards over the staminal-column. *Anthers* auricled at base; appendages orbicular, inflexed over the style-apex. *Style-apex* columnar, depressed, 5-angled. *Follicles* lanceolate-acuminate, 3 to 3·5 in. long; pericarp thin, smooth, glabrous. *Seeds* elliptic, plano-convex, .2 in. long, .15 in. broad, with a broad, thin margin; testa dark brown, thin, lineate; coma .75 to 1 in. long; cotyledons ovate, small; radicle cylindric,

nearly as long as cotyledons. Roxb. Hort. Beng. 20; Lodd. Bot. Cab. t. 349; Bot. Reg. I. t. 81; Dene. in DC. Prodr. VIII. 566; Dalz. and Gibs. Bomb. Fl. Suppl. 54; Miq. Fl. Ind. Bat. II. 485; Baill. Hist. des Pl. X. 221, figs. 157-165; Hook. f. Fl. Br. Ind. IV. 18; N. E. Brown in Dyer Fl. Trop. Afr. IV. i. 328; Cooke Fl. Bomb. II. 180; Prain Beng. Plants 689.

PERAK: *Scortechini*. JOHORE: *Curtis*. SINGAPORE: *Hullett* 85. An introduced plant, now naturalized in Africa, India and Malaya, chiefly in waste places near villages.—DISTRIB. Tropical America, where native.

15. RHAPHISTEMMA, Wall.

Climbing glabrous shrubs with milky juice. *Leaves* opposite, membranous. *Flowers* in axillary long-peduncled umbelliform or subracemose cymes, large, white, long-pedicelled. *Calyx* deeply 5-fid or 5-partite, 5-glandular within at base. *Corolla* campanulate, 5-lobed; lobes spreading, twisted in bud, overlapping to the right; tube broad. *Corona*-processes 5, membranous, subulate-acuminate, adnate to the staminal-column and produced above it to twice its length. *Stamens* affixed to the base of the corolla; filaments connate in a short tube; anthers with an inflexed membranous appendage; pollen-masses one in each cell, oblong, not compressed, pendulous, waxy, attached to the thick hollow furrowed hard pollen-carrier by short clavate caudicles. *Ovary* of 2 carpels; style distinct to near the top; style-apex large, fleshy, 5-lobed, convex at tip. *Fruit* of (by abortion) 1 thick, fleshy, smooth, subventricose follicle. *Seeds* plano-convex, margined, comose.—DISTRIB. Two species; one of India and Burma and the Malay Peninsula, the other of Java.

RHAPHISTEMMA PULCHELLUM, Wall. Pl. As. Rar. II. 50, t. 163 (1831) and Cat. 8221A. A glabrous climbing shrub; branches greyish-brown when dry, terete, much twisted; the nodes with a line of small glands between the leaf-petioles. *Leaves* membranous; ovate-acuminate at apex, cordate at base, with wide sinus often .75 to 1 in. deep; lower surface pale when dry; 3 to 7 in. long, 2.5 to 4.5 in. broad; midrib prominent, bearing at its base a cluster of subulate small fleshy glands; main nerves 6 to 8 pairs, the lowest 2 to 3 pairs radiating from opposite the gland-cluster, the rest curving upwards and anastomosing near the margin, raised beneath; reticulations few, conspicuous, transverse; petiole 2 to 5 in. long, sulcate above. *Cymes* 4- to 6-flowered; peduncle 1.5 to 5 in. long; branches few; pedicels slender, .5 to 2 in. long; bracts short, lanceolate, deciduous; buds oblong, .5 to 1 in. long; flowers white, thick. *Calyx*-lobes ovate-oblong, variable in size, usually .15 to .2 in. long; glands minute. *Corolla*-lobes oblong, obtuse, reflexed in

flower, .5 in. long; tube longer. *Corona*-processes subulate-acuminate, membranous, .5 in. long, .1 in. broad. *Anthers* horny, yellowish, smooth, sagittate at base; appendages rounded, membranous, incurved over the stigma. *Style-apex* 5-lobed; the lobes horned; tip umbonate, minutely pitted. *Follicles* solitary, fusiform, turgid, somewhat saccate at base, the apex obtuse with a short hook; pericarp leathery, smooth. *Seeds* plano-convex with a broad margin, ovate, .4 in. long, with a broad apex bearing a silky coma 1 to 2 in. long; testa brown, thin; cotyledons ovate, cordate, .125 in. long; radicle cylindric, .75 in. long. Wight Contrib. 55; Dene. in DC. Prodr. VIII. 516; Paxt. Fl. Gard. III. t. 101; Paxt. Mag. XIV. 27, with fig.; Fl. des Serres t. 223; Miq. Fl. Ind. Bat. II. 477; Hook. f. Fl. Br. Ind. IV. 19; Prain Beng. Plants 691. *Asclepias pulchella*, Roxb. Hort. Beng. 21, Fl. Ind. II. 54.

KEDAH: Coah, Lankawi Island, *Curtis* 2118. PENANG: *Curtis* (cult.). PERAK: in bamboo jungle at about 400 to 600 ft. Ulu Bubong, *King's Collector* 10483. SINGAPORE: *Deschamps* (cult.); *G. King* (cult.).—DISTRIB. India (Sikkim, Chota Nagpur, Sylhet, Assam and Cachet), Burma.

#### 16. ISCHNOSTEMMA, King & Gamble, nov. gen.

Twining slender undershrubs. *Leaves* opposite. *Flowers* in slender few-flowered, lateral, pedunculate umbels; pedicels filiform. *Calyx* 5-fid; lobes acuminate. *Corolla* rotate; tube short; lobes long, slender, overlapping to the right, twisted to the left in bud. *Corona* of 5 membranous lanceolate flattened processes attached to the base of the staminal-column. *Staminal-column* attached to the base of the corolla-tube; anthers slender; appendages short, membranous, obtuse, connivent over the style-apex; pollen-masses 1 in each cell, pendulous, ellipsoid, attached by slender clavate descending caudicles to the crustaceous pollen-carriers. *Ovary* of 2 carpels; style connate above; style-apex 5-angled; tip rounded. *Fruit* of 1 (or 2 ?) long-acuminate slender, follicular mericarps; testa thin, smooth. *Seeds* small, flat, winged, nearly orbicular, comose; albumen scanty; cotyledons small, ovate; radicle cylindric.—DISTRIB. One species; Malay Peninsula and Philippine Islands.

ISCHNOSTEMMA SELANGORICA, King & Gamble, n. sp. A slender twining greyish undershrub; branchlets slender, terete. *Leaves* membranous, variable; ovate-lanceolate obovate or oblanceolate, mucronate at apex, attenuate at base; glabrous and pale green on both surfaces; 1 to 1.75 in. long, .5 to .75 in. broad; midrib broad, flattened; main nerves 4 to 6 pairs, very faint, curving upwards to meet in a faint intramarginal nerve; reticulations obscure; petiole slender, .25 to .5 in. long.

*Umbels* usually 3- to 5-flowered; peduncles .75 in. long; bracts minute, subulate; pedicels filiform, .5 to .75 in. long; buds conical; flower yellow. *Calyx* cleft to the base; lobes lanceolate, acuminate, .1 in. long. *Corolla*-tube very short; lobes lanceolate, acuminate, .2 in. long. *Corona*-processes acuminate, erect, longer than the column. *Style-apex* hemispheric at tip. *Follicles* lanceolate, long-acuminate, 2.5 in. long, .25 in. broad; testa thin, smooth. *Seeds* flattened, nearly orbicular, .175 in. long, .1 in. broad, broadly winged; testa brown, thin, slightly granular; embryo very small, .03 in. long in all.

SELANGOR: at Kwala Selangor, in mangrove swamps, *Ridley* 7564.—  
DISTRIB. Philippine Islands, in Central Luzon (*Loher* 4039, 4040).

# 17. CYNANCHUM, Linn.

Herbs or shrubs, erect or twining. *Leaves* opposite. *Flowers* small, in sessile or pedunculate corymbose or umbellate cymes or racemes, subaxillary or lateral between the bases of the petioles. *Calyx* 5-partite, with 5 to 10 glandular scales within or eglandular. *Corolla* deeply 5-fid, rotate or campanulate; lobes slightly overlapping to the right in bud, more or less twisted. *Corona* arising from the staminal-column at or near the base, often membranous, annular, cupular or tubular, toothed or lobed at the top or divided more or less deeply into 5 entire or toothed processes. *Staminal-column* arising at or near the base of the corolla; filament part varying from none to rather long and slender; anthers hardened; appendages membranous, erect or inflexed over the style-apex; pollen-masses 1 in each cell, oblong, not compressed, pendulous, attached by a caudicle to the rather large horny pollen-carriers. *Ovary* of 2 carpels; styles free below; style-apex 5-lobed, truncate, conical or rostrate. *Fruit* of 2 smooth follicular mericarps, winged or entire, sometimes with tubercular processes. *Seeds* plano-convex, tipped with a silky coma.—DISTRIB. Cosmopolitan, species about 100.

Leaves ovate or oblong, not cordate at base; peduncles short;	
follicles smooth .. .. .	1. <i>C. ovalifolium</i> .
Leaves ovate, deeply cordate at base; peduncles long; follicles	
with soft hooked spines .. .. .	2. <i>C. corymbosum</i> .

1. CYNANCHUM OVALIFOLIUM, Wight Contrib. 57 (1834). A nearly glabrous, small twining shrub; branchlets very slender, terete, pale brown. *Leaves* membranous; ovate or oblong, acuminate at apex, rounded or subacute at base, often furnished with one or two small axillary, unequal-sided leaflets at the base of the petiole; both surfaces glabrous, lower pale; margins slightly recurved; 3 to 4.5 in. long, 1.25

to 2 in. broad; the axillary leaflets about .5 in. long; midrib rather broad, channelled above; main nerves 7 to 8 pairs, at first straight, then curved upwards to form a looped intramarginal nerve near the edge; secondary nerves few; reticulations few, obscure; petiole .5 to .75 in. long, articulate near the base, the upper side channelled and with a line of hairs, the base enlarged, those of each pair forming a cup round the branchlet. *Cymes* lateral, between the leaves, about 4-to 8-flowered, racemose; peduncle .5 to .75 in. long; pedicels .1 to .15 in. long, puberulous; bracts small, obtuse; flower-buds spherical. *Calyx*-lobes ovate, .05 in. long; glandular scales 5, minute, alternate with the lobes. *Corolla* cleft nearly to the base; lobes concave, obtuse, .15 in. long. *Corona* membranous, .1 to .15 in. deep, cylindric, divided above into 10 or more irregular teeth. *Staminal-column* rather long; wings horny, sagittate at base; appendages membranous rounded, crenate, erect or slightly curved over the style-apex; pollen-masses ellipsoid, waxy, attached by clavate caudicles to the rather large black pollen-carriers. *Style-apex* 5-angled, depressed, with a small rounded tip. *Follicles* usually 1 only, thickly coriaceous, nearly straight on the dorsal, curved on the ventral edge, 3 to 5 in. long by .75 to 1 in. broad, tip recurved-hooked, base slightly gibbous; pericarp smooth. *Seeds* nearly orbicular, plano-convex, broadly winged, .3 to .35 in. long, .25 in. broad, ending in a broad tip which bears a white silky coma 1.5 in. long; testa thin, granular and wrinkled, dark brown; cotyledons ovate, obtuse, .1 in. by .075 in.; radicle cylindric, .05 in. long. Wall. Cat. 8226; Hook. f. Fl. Br. Ind. IV. 23. *Cynoctonum ovalifolium*, Dene. in DC. Prodr. VIII. 529; Miq. Fl. Ind. Bat. II. 479.

PENANG: Wallich 8226; Curtis 871, 1270. PROVINCE WELLESLEY: on the road to Arakuda, Ridley 7029. PERAK: Wray 1763, 2061, 2939; King's Collector, 2575, 8385, 8450; Scortechini 789. MALACCA: Maingay (K.D.) 1140. SINGAPORE: Ridley 10160.—DISTRIB. Java.

2. *CYNANCHUM CORYMBOSUM*, Wight Contrib. 56 (1834). A slender climbing shrub; stem rather stout; branchlets terete, glabrous, with rather long internodes. *Leaves* membranous when dry, dull green when fresh; ovate or orbicular, cuspidately acuminate at apex, cordate at base with a sinus .4 in. deep, .5 in. broad; under surface pale, glaucous, upper surface glabrous except the midrib and main nerves; margins slightly recurved, 2 to 6 in. long, 1 to 3 in. broad; midrib slender, raised beneath, furnished at the base with a tuft of minute glands; main nerves 5 to 6 pairs, the lowest 3 pairs spreading from opposite the gland-tuft, the rest curved upwards to near the margin; reticulations rather scanty, chiefly transverse; petiole 1.5 to 3 in. long, slender. *Cymes* corymbiform, many-flowered, 2 to 3 in. long, glabrous;



peduncle slender, about 1·5 in. long; bracts minute, subulate; pedicels slender, ·5 in. long; buds ovoid. *Calyx* deeply cleft; lobes ovate, acute, hyaline on the margins, ·05 in. long; scales obscure. *Corolla* campanulate; tube very short; lobes erect, oblong, obtuse, ·15 in. long; margins usually somewhat reflexed. *Corona* as long as corolla-lobes, campanulate, irregularly crenately 10- or more lobed with 10 internal longitudinal folds. *Staminal-column* inserted at the base of the corolla-tube; anther-wings broad, horny; cells pocket-like; appendages ovate-acute; pollen-masses ellipsoid, attached by short clavate caudicles to the small oblong pollen-carriers. *Style-apex* 5-angled; tip acuminate, bifid. *Follicles* 1 or 2, reddish, lanceolate, long-acuminate, 3 to 5 in. long, 1 to 1·5 in. broad; pericarp thick, densely clothed with soft reversed-hooked spines ·25 to ·5 in. long. *Seeds* orbicular-ovoid, ·5 in. long and nearly as broad, wrinkled, broadly winged, deeply dentate-crenate at the lower end; tip truncate, crowned with a 1 to 1·5 in. long white silky coma; testa dark brown, shining, rugose on the dorsal face; cotyledons elliptic, ·15 in. long; radicle cylindric, acute, ·075 in. long. Wall. Cat. 8222, 8231; Hook. f. Fl. Br. Ind. IV. 24. *Cynoctonum corymbosum*, Dcne. in DC. Prodr. VIII. 528.

PENANG: *Wallich*. PERAK: on shrubs at 300 to 500 ft., *King's Collector* 5301; *Scortechini*.—DISTRIB. India (Sikkim, Assam, Sylhet, Cachar, Nicobar Islands).

#### Tribe IV. MARSDENIÆ.

Stamens with filaments connate into a tube; anthers erect or incumbent on the style-apex and adnate to it at their base, with flat or inflated membranous appendages. Pollen-contents of each anther-cell united into a waxy mass; pollen-masses opaque, without a pellucid margin, attached in pairs to the pollen-carriers by long or short caudicles, erect or ascending or horizontal, never entirely pendulous, sometimes very minute and the caudicles very slender; pollen-carriers hard and horny, with a dorsal suture, usually dark-coloured.

Corolla-lobes overlapping (sometimes valvate or nearly so in

*Gongronema*):—

Corona none .. .. . 18. SARCOLOBUS.

Corona corolline:—

Corolla-lobes long; style-apex included; herbs .. 19. PENTASACME.

Corolla-lobes short; style-apex exserted; twining shrubs .. 20. GYMNEMA.

Corona staminal, rarely none:—

Corolla urceolate or campanulate, sometimes rotate:—

Corona-processes fleshy, rounded .. .. 21. GONGRONEMA.

- Corona-processes fleshy or membranous, with one or sometimes two apical teeth, sometimes none .. 22. *MARSDENIA*.
- Corolla hypocrateriform :—
- Corolla small or moderate-sized; corona-processes compressed, beaked .. .. 23. *PERGULARIA*.
- Corolla large; corona-processes none or flattened .. 24. *STEPHANOTIS*.
- Corolla rotate or rotate-campanulate; corona-processes small, on the filament part of the column .. 25. *TYLOPHORA*.
- Corolla-lobes valvate :—
- Corolla rotate or subcampanulate :—
- Corona-processes spreading, lower lobes usually dentate or laciniate, upper lobes tubercular or absent; leaves not fleshy; climbing shrubs .. .. 26. *HETEROSTEMMA*.
- Corona stellate, lower lobes erect or spreading, upper beaked; leaves usually fleshy; epiphytes or epiphytic climbers .. .. 27. *HOYA*.
- Corolla urceolate or cylindric or campanulate; corona-processes very membranous; epiphytes .. .. 28. *DISCHIDIA*.
- Corolla-tube short, lobes long subulate; twining under-shrub .. .. 29. *PYCNORHACHIS*.

18. *SARCOLOBUS*, Br.

Twining glabrous shrubs. *Leaves* opposite. *Flowers* small, in crowded, pedunculate, axillary or interpetiolar corymbiform cymes. *Calyx* 5-partite, with 5 minute glandular scales at the base within. *Corolla* campanulate or subrotate, 5-fid; the lobes overlapping to the right. *Corona* none. *Stamens* affixed to the base of the corolla; filaments connate in a short tube; anthers broad, ending in a spatulate inflexed appendage; pollen-masses solitary in each cell, erect, compressed, obovate, attached by long filiform twisted caudicles to the narrow, long, channelled pollen-carriers. *Ovary* of 2 distinct carpels; styles distinct below, ending above in a 5-angled style-apex with flat or slightly rounded tip. *Fruit* of usually 1 thick globose and smooth or ovate and 2-keeled follicular mericarp; pericarp fleshy, chartaceous when dry. *Seeds* large, marginate, without coma.—*DISTRIB.* Species 3: two of India, the Malay Peninsula, and the Andaman and Nicobar Islands; the third of Java.

*SARCOLOBUS GLOBOSUS*, Wall. in *Asiat. Research.* XII. 577, t. 4 (1818), and Cat. 4468. A twining shrub; branchlets slender, smooth, shining, callose-punctate, pale brown. *Leaves* thinly coriaceous; oblong or ovate-oblong, acute or shortly acuminate at apex, rounded at base and usually somewhat unequal-sided; both surfaces brown when dry, lower glaucous, young leaves slightly puberulous; margins slightly recurved; 3 to 4.5 in. long, 1 to 1.75 in. broad; midrib slender, channelled above and furnished with a small cluster of glands at the base,

raised on the lower surface; main nerves 5 to 7 pairs, broadly arched to meet in a looped intramarginal nerve rather far from the edge; reticulations irregular, chiefly transverse; petiole slender, .5 to 1 in. long, channelled and puberulous on the upper surface. *Cymes* many-flowered, slightly puberulous; peduncles .5 to .75 in. long, thickened at top below the corymbs; pedicels .25 in. long, slender; bracts small, triangular; buds broadly ovoid. *Calyx*-lobes scarious, ovate, obtuse, .05 to .1 in. long; scales minute, 5 to 10. *Corolla*-lobes nearly orbicular, pubescent within, .2 in. long, pale purple. *Anthers* slightly auricled; appendages much incurved. *Style*-apex 5-lobed with a rounded tip. *Follicle* globose, retuse at apex and base, 4 in. in diam.; pericarp very thick, with many raised dots. *Seeds* broadly obovate, flat with a raised border, apiculate, .7 to 1 in. long; coma none; testa dark brown; cotyledons obovate, retuse at apex; radicle small. Wight Contrib. 47, and Ic. t. 1273; Dene. in DC. Prodr. VIII. 625; Hook. f. Fl. Br. Ind. IV. 27; Prain Beng. Plants 693. *S. carinatus*, Griff. Notul. IV. 53, and in Ic. Pl. Asiat. t. 410 (not of Wall.).

PERAK: *Scortechini* 127, 1393; *King's Collector* 1028, 1162. MALACCA: *Griffith* 3773. SINGAPORE: *Hullett* 32, 648; *Ridley* 5745.—DISTRIB. India (Salt Lakes, Calcutta, *C. B. Clarke*), Burma (Mergui, *Griffith*), Borneo (*Haviland*). A plant of the banks of salt river-creeks.

#### 19. PENTASACME, Wall.

Tufted erect glabrous herbs, with slender simple stems and many wiry roots, rooting on rocks. *Leaves* opposite, membranous, narrow. *Flowers* yellowish or white, small, in short axillary umbelliform or racemose cymes; pedicels capillary. *Calyx* 5-partite, with 5 glandular scales within. *Corolla*-tube short, campanulate; lobes narrow, caudate, twisted, overlapping to the right in bud. *Corona*-processes 5, on the corolla-tube, entire or toothed. *Staminal-column* very short; anther-appendages membranous; pollen-masses 1 in each cell, erect, ovoid, waxy, attached near the middle by a slender caudicle to an oblong pollen-carrier. *Ovary* of 2 carpels; style short; style-apex 5-angled, conical or beaked at apex. *Fruit* of 1 slender terete follicle, straight; pericarp thin, smooth. *Seeds* oblong-spathulate, not or very slightly winged, convex on both surfaces; cotyledons ovate; radicle cylindric.—DISTRIB. Species 3 or 4: two of India and Malaya, the other Chinese.

PENTASACME CAUDATUM, Wall. Cat. 8234 (1829). A tufted erect glabrous herb; stems simple, many, slender, 12 to 18 in. long, pale brown, terete, .1 in. in diam.; roots many, slender, twisted, spreading. *Leaves* membranous; linear-lanceolate, long caudate-acuminate at apex, narrowed at base; pale on both surfaces when dry, under surface

glaucous; 2 to 4 in. long, .2 to .4 in. broad; midrib slender, prominent; main nerves about 12 pairs, obscure, acutely curving upwards to meet an intramarginal slightly-looped nerve; reticulations hardly visible; petiole none or up to .1 in. long; stem clasping at base. *Cymes* racemose, 1- to 6-flowered, very short; peduncles very short; pedicels capillary, .2 to .25 in. long; bracts minute; flowers white; buds conical. *Calyx*-lobes ovate-lanceolate, acuminate, .06 in. long; glands dark. *Corolla*-lobes caudate-acuminate from a broad base, .25 in. long; tip obtuse. *Corona*-processes short, obscurely 4-lobed behind; lobes with several short obtuse teeth in front. *Follicles* 1.75 to 3 in. long, very slender, straight; pericarp thin. *Seeds* ovate-spathulate, with a minute wing near the base, concave, .15 in. long; tip obliquely truncate with a white silky coma .5 to .75 in. long; testa thin, brown, papillose; cotyledons ovate, .05 in. long; radicle cylindric, .025 in. long. Wight Contrib. 60; Dene. in DC. Prodr. VIII. 627; Miq. Fl. Ind. Bat. II. 501; Hook. f. Fl. Br. Ind. IV. 28. *Spiladocorys angustifolia*, Ridley in Trans. Linn. Soc. Ser. 2, III. 322, t. 63.

PERAK: growing on rocks in the beds of streams; *Curtis*; *Ridley* 2885; *Scortechini* 1310; *Wray* 1980; *King's Collector* 10685. PAHANG: on Tahan river, *Ridley* 2589.—DISTRIB. India (Khasia Hills, Patkoi Hills, and Sylhet), Burma.

## 20. GYMNEMA, Br.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in crowded sublateral or opposite umbelliform cymes. *Calyx* 5-partite, eglandular or with 5 to 10 glandular scales at the base within. *Corolla* subrotate, campanulate or urceolate, 5-fid; lobes thick, narrowly overlapping to the right in bud or subvalvate. *Corona*-processes 5, arising from and adnate to the corolla-tube, either of 5 fleshy lobes adnate up to the mouth of the corolla-tube with more or less free incurved points, or of 5 pairs of fleshy ridges on the lower part of the tube, alternating with the corolla-lobes. *Staminal-column* arising from the base of the corolla; anthers short, erect, with short membranous appendages; pollen-masses erect, attached to the pollen-carriers by very short caudicles. *Ovary* of 2 carpels; styles free to near the top; style-apex large, conical, clavate or capitate, exserted beyond the anthers. *Fruit* of 2 (or 1) smooth follicular mericarps. *Seeds* comose.—DISTRIB. About 20 species, chiefly Asiatic, two extending to Central Africa, others to Australia.

Corolla-tube short, with corona-processes of 5 fleshy villous lobes on the throat, the free points exserted in the sinuses:—

Leaves 3 to 6 in. long, tawny-pubescent beneath; cymes subcapitate, shortly peduncled .. .. .

1. *G. acuminatum*.

- Leaves 2 to 4 in. long, nearly glabrous; cymes umbellate,  
 peduncled .. .. . 2. *G. lactiferum* var.  
*nitens*.  
 Leaves 1 to 2 in. long, tawny-pubescent; cymes subsessile .. 3. *G. Maingayi*.  
 Corolla-tube elongate, with corona-processes consisting of villous  
 ridges in the lower part of the tube, but no free points in the  
 sinuses; leaves 2·5 to 6 in. long .. .. . 4. *G. tingens*.

1. GYMNEMA ACUMINATUM, Wall. Tent. Fl. Nap. 50 (1826); Cat. 8187. A large twining shrub with corky bark; branchlets softly tawny-pubescent. *Leaves* coriaceous; ovate or ovate-elliptic, acuminate at apex, rounded at base; upper surface glabrous, lower tawny-pubescent; margin slightly recurved; 3 to 6 in. long, 1·75 to 2·25 in. broad; midrib stout; main nerves 4 to 6 pairs, curved upwards to anastomose near the margin; reticulations in a prominent network; petiole ·5 in. long. *Cymes* in pairs, many-flowered, subcapitate, tawny-pubescent; peduncle as long as or shorter than the petiole, pedicels very short. *Calyx*-lobes ovate-acute, ·05 in. long, pubescent without; scales very small. *Corolla*-lobes rounded, the tips incurved, ·075 to ·1 in. long, glabrous. *Corona* of rounded, incurved processes alternate with the corolla-lobes, with bearded short ridges below them half-way down the tube. *Anthers* short; appendages erect, rounded, membranous; pollen-masses oblong, attached to the pollen-carriers by very short or almost no caudicles. *Style-apex* fleshy, globose-conical. *Follicles* 3 in. long, ovoid, turgid, beaked, woody, cordate at base; pericarp glabrous. *Seeds* large, ·7 in. long, flat, elliptic, broadly winged, the wing membranous. Wight Contrib. 45; Dene. in DC. Prodr. VIII. 622; Miq. Fl. Ind. Bat. II. 499; Hook. f. Fl. Br. Ind. IV. 30; Prain Beng. Plants 694. *Cynanchum acuminatum*, Herb. Ham. *Asclepias acuminata*, Roxb. Hort. Beng. 21, and Fl. Ind. II. 55.

KEDAH: Langkawi Island, *Curtis* 2811. MALACCA: *Griffith*; *Maingay* (K.D.) 1109.—DISTRIB. India (Eastern Bengal and Chittagong), Burma, Java.

2. GYMNEMA LACTIFERUM, Br. in Mem. Wern. Soc. Edinb. I. 33 (1808); Wight Contrib. 44; Dene. in DC. Prodr. VIII. 622; Hook. f. Fl. Br. Ind. IV. 30; Trimen Fl. Ceyl. III. 154. *G. zeylanicum*, Dene. in DC. l. c. *Asclepias lactifera*, Linn. Sp. Pl. 216.

VAR. *nitens*, Hook. f. Fl. Br. Ind. IV. 31. A twining shrub; branchlets smooth, dark brown, glabrous, the uppermost pubescent. *Leaves* membranous when dry and reddish brown; ovate-lanceolate, acuminate at apex, acute at base; glabrous on both surfaces or the midrib and nerves beneath pubescent; margins recurved; 2 to 4 in. long, ·75 to 1·5 in. broad; midrib slender; main nerves about 6 pairs, curving acutely upwards to an irregular intramarginal nerve, not prominent; reticula-

tions faint; petiole slender, .3 to .4 in. long. *Cymes* in pairs, opposite, alternate with the leaves, minutely pubescent; umbels racemose, with minute persistent bracts 10- to 12-flowered; peduncles .25 in. long; pedicels slender, .1 to .15 in. long; buds ovoid. *Calyx*-lobes ovate with scarious margins, .05 in. long; glands 5, subulate, black. *Corolla* .075 in. long; lobes as long as tube, rounded. *Corona* of 5 pairs of bearded ridges on the corolla-tube alternate with the lobes, and with small rounded incurved tips. *Anther*-appendages rounded, minutely erose; pollen-masses spatulate, connected by short jointed rounded caudicles to the oblong pollen-carriers. *Style-apex* globose. *Fruit* not seen. *G. nitens*, Blume Mus. Bot. I. 149, t. 29; Miq. Fl. Ind. Bat. II. 498. *G. Malayanum*, Griff. Notul. IV. 56, and Ic. Pl. Asiat. t. 394.

PENANG: *Curtis*. PERAK: *Scortechini* 2007. MALACCA: *Maingay* (K.D.) 1110.—DISTRIB. Sumatra, Borneo (*Motley* 383).

3. *GYMNEMA MAINGAYI*, Hook. f. Fl. Br. Ind. IV. 31 (1883). A slender much twining undershrub; branchlets finely tawny-pubescent; the bark papery. *Leaves* membranous when dry; ovate-acuminate at apex, cordate at base; both surfaces pubescent; the hairs with bulbous bases, yellow when dry; margins slightly recurved; 1 to 2 in. long, .75 to 1 in. broad; midrib prominent, impressed above, sometimes with a small gland at the base; main nerves 4 to 5 pairs arching upwards and anastomosing near the margin; reticulations not easily visible; petiole .125 to .25 in. long, curved, easily detached at the base. *Cymes* subsessile, pubescent; the peduncle when present short, thickened; pedicels slender, .1 to .2 in. long; bracts most minute; buds oblong-conical. *Calyx* deeply cleft, pubescent without; lobes oblong, obtuse, .05 in. long; scales invisible. *Corolla* campanulate; tube .075 in. long; lobes ovate, .025 in. long, glabrous, thickened. *Corona* of small fleshy obtuse scales in the sinuses of the corolla-lobes, and a decurrent hairy ridge below extending about half-way down the tube. *Staminal-column* columnar; anther-wings long; appendages rounded, short, scarious; pollen-masses clavate, connected by very short jointed caudicles to the nearly globose pollen-carriers. *Style-apex* dome-shaped, much exceeding the anthers. *Fruit* not known.

MALACCA: *Maingay* (K.D.) 1111.

4. *GYMNEMA TINGENS*, Wight Contrib. 45 (1834). A slender climbing shrub; branchlets dark brown, slender, smooth, somewhat thickened at the nodes. *Leaves* membranous when dry; ovate-acuminate at apex, rounded shallowly cordate or (when young) slightly cuneate at base; both surfaces glabrous, olive-green when dry; margins slightly recurved; 2.5 to 6 in. long, 1 to 3 in. broad; midrib slender, raised beneath; main nerves 5 to 8 pairs, the lowest 2 to 3 pairs rather close

together and more spreading than the rest; reticulations many, obscure; petiole slender, .75 to 1.5 in. long, channelled above. *Cymes* as long as or shorter than the petioles, axillary between the leaves, puberulous; peduncles slender, .5 to .75 in. long; branches few, short, much thickened, bracteate, bearing spirally racemose many-flowered umbels; pedicels capillary, .5 in. long; buds conical; flowers pale yellow. *Calyx*-lobes oblong, .15 to .2 in. long, ciliate; glands 5, very small. *Corolla*-tube .1 in. long, pubescent within; lobes .15 in. long, narrowly oblong, obtuse, glabrous. *Corona* of thickened hispidly bearded broad ridges inside the corolla-tube a little way below the sinuses of the lobes; no free scales at the sinuses. *Staminal-column* slender, .15 in. long; appendages ovate, membranous, erect; pollen-masses oblong-clavate, attached to the ovoid pollen-carriers by very short clavate caudicles. *Style*-apex elongate, clavate, much exceeding the anther-column. *Follicles* solitary, slender, straight or very slightly curved, 5 to 6 in. long, .4 to .5 in. broad, point acuminate; pericarp smooth, ribbed. *Seeds* elliptic, flat, .5 in. long, .3 in. broad, with a broad wing, base obtuse, apex slightly produced and truncate, surmounted by a white silky coma 1.5 in. long; testa thin, dark brown; cotyledons elliptic, .15 in. long; radicle cylindric, .075 in. long. Wall. Cat. 8190; Hook. f. Fl. Br. Ind. IV. 31; Prain Beng. Plants 694. *G. tingens* var. *cordifolia*, Wight Ic. t. 593. *Bidaria tingens*, Dene. in DC. Prodr. VIII. 623, partly. *Asclepias tingens*, Roxb. Hort. Beng. 21, and Fl. Ind. II. 53.

PERAK: at Ulu Bubong, 400 to 600 feet, clinging to large trees, King's Collector 10242; at Chanderiang under 300 feet, *ib.* 5747.—  
DISTRIB. India, Burma.

## 21. GONGRONEMA, Dene.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in sessile or pedunculate or branching cymes, often umbelliform, in one of the axils of a pair of leaves, often with thickened tuberculate bracteate rachises (as in *Hoya*). *Calyx* 5-partite, glandular or eglandular within. *Corolla* urceolate subrotate or broadly campanulate; the lobes narrowly overlapping to the right (valvate in *G. Wrayi*). *Corona*-processes 5, adnate to the staminal-column near the base, usually small and rounded, sometimes large, erect. *Staminal-column* inserted at the base of the corolla, short; anther-appendages membranous, inflexed over the style-apex; pollen-masses solitary in each cell, erect, ovoid, waxy, attached by slender curved caudicles to rather large ellipsoid pollen-carriers. *Ovary* of 2 carpels; style short; style-apex conical or convex. *Fruit* of 2 (more usually 1) smooth, acuminate follicular mericarps. *Seeds* comose.—DISTRIB. Species about 10; Asiatic, African, and Australian.

Corolla urceolate; cymes shorter than the petioles; corona rounded, more or less adherent to the staminal-column:—

Leaves rounded at base; caudicles of pollinia curved, slender 1. *G. Wallichii*.

Leaves cordate at base; caudicles of pollinia clavate .. 2. *G. Curtisii*.

Corolla campanulate; cymes longer than the petioles; corona ligulate, angularly bent upwards; caudicles slender, straight .. 3. *G. bracteolatum*.

Corolla campanulate, almost hypocrateriform; cymes shorter than the petioles; corona dorsally flattened below, radically flattened above; caudicles long, much curved .. 4. *G. Wrayi*.

1. GONGRONEMA WALLICHII, Dene. in DC. Prodr. VIII. 624 (1844). A small twining shrub; branchlets slender, pale brown, smooth. *Leaves* firmly membranous; elliptic-oblong or -lanceolate, shortly acuminate at apex, rounded at base; both surfaces glabrous, the lower paler; margins slightly recurved; 3 to 6 in. long, 1 to 2 in. broad; midrib slender, impressed above, raised beneath, with a small tuft of glands at the base just above the petiole; main nerves 5 to 6 pairs, arched upwards to meet in a prominent intramarginal looped nerve; secondary nerves and reticulations few, irregular; petiole .5 to .75 in. long, slender, twisted. *Cymes* subsessile, racemiform, few-flowered, shorter than the petioles, on a stout rachis tuberculate with many persistent small rounded imbricate bracts; pedicels slender, .1 to .15 in. long; buds globose. *Calyx*-lobes ovate-acute, scarious, .05 in. long; scales 5, minute. *Corolla* urceolate; tube .1 in. long, nearly globose, minutely hairy within; teeth acuminate, erect or spreading, .05 in. long. *Corona*-processes broad, somewhat incurved, rounded at the tip from a broad base, adherent to the base of the staminal-column, fleshy. *Staminal-column* short; appendages membranous, acuminate; pollen-masses oblong-ovoid, attached by slender curved caudicles to the ovoid pollen-carriers. *Style-apex* shortly 5-lobed, with a conical apiculus. *Follicles* slender, straight or gently curved, linear-lanceolate, acuminate, 6 in. long, .3 to .4 in. broad; pericarp smooth. *Seeds* ovate, spathulate, flattened, .3 to .35 in. long, twisted, with a broad wing. Miq. Fl. Ind. Bat. II. 500; Hook. f. Fl. Br. Ind. IV. 33. *Gymnema Wallichii*, Wight Contrib. 46; Wall. Cat. 8195a.

PROVINCE WELLESLEY: Ridley 7029. MALACCA: Griffith (K.D.) 3770; Maingay (K.D.) 1113.—DISTRIB. Borneo (*Haviland* 3503).

2. GONGRONEMA CURTISII, King & Gamble, n. sp. A slender small twining shrub; branchlets pale brown, slender, smooth; innovations tawny-pubescent. *Leaves* membranous when dry; elliptic-lanceolate or -obovate, broadly acuminate at apex, shortly cordate at base; tawny-pubescent on both surfaces when young, glabrescent when older, except on the margins and midrib, under surface pale grey; 2.5 to 3 in. long, .75 to 1.5 in. broad; midrib broad, prominent beneath, with



a small glandular tuft at the base just above the petiole; main nerves 5 to 6 pairs, very faint, curved upwards to a faint intramarginal nerve; reticulations not distinguishable; petiole slender, .5 to .75 in. long, twisted at base. *Cymes* shorter than the petioles, pubescent, sessile or very shortly pedunculate, 2-flowered with a thickened bracteate rachis; pedicels slender, .05 to .1 in. long; buds globose-conical; flowers pale green. *Calyx*-lobes ovate-acute, pubescent, ciliate, .075 in. long; scales about 10. *Corolla* urceolate; tube .15 in. long, pubescent within; lobes oblong, acute, spreading, twisted, .1 in. long. *Corona*-processes rounded, curved downwards, attached to the base of the anthers, columnar, fleshy. *Anthers* short; appendages erect, membranous, triangular-ovate; pollen-masses oblong-ovoid, waxy, attached by slender slightly clavate caudicles to the rather large ovate pollen-carriers. *Style-apex* of a 5-lobed flattened ring, surrounded by a large rounded conical apiculus. *Fruit* not known.

PENANG: on West Hill at 2000 ft., *Curtis* 1545. PERAK: at Lower Camp, Gunong Batu Patch, *Wray* 1011.

3. *GONGRONEMA BRACTEOLATUM*, King & Gamble, n. sp. A small twining shrub; branchlets rather stout, brown, uppermost minutely puberulous. *Leaves* coriaceous; oblong-lanceolate, acuminate at apex, cordate at base; when young puberulous, when old glabrescent, except on the midrib; margins recurved; 3 to 6 in. long, 1.25 to 1.75 in. broad; midrib rather stout, keeled above, furnished with a tuft of small glands at the base just above the petiole; main nerves 6 to 7 pairs, acutely curving upwards to join in a looped intramarginal nerve; reticulations obscure; petiole .75 to 1 in. long, curved. *Cymes* longer than the petioles, racemose, on .5 to .75 in. long, thickened, many-bracted rachises at the ends of the peduncles; peduncles thick, woody, .5 in. long; pedicels .15 to .2 in. long; bracts ovate-acute; buds conical; flowers yellow. *Calyx*-lobes ovate-acute, glandular, ciliate, scarious, .05 in. long; scales 10, minute. *Corolla* campanulate, broad; tube .1 in. long, pubescent within; lobes triangular, ovate-acute, spreading, .15 in. long. *Corona*-processes attached to the back of the staminal-column at its lower part, thick, fleshy, ligulate, bent in the middle and curving over the top of the staminal-column and style-apex. *Anthers* with a short, membranous, acuminate, incurved appendage; pollen-masses ovoid, attached by slender straight caudicles to the rather large pollen-carriers. *Style-apex* annular, obscurely 5-lobed; the apiculus convex. *Fruit* not known.

PERAK: at Goping, *King's Collector* 721.

4. *GONGRONEMA WRAYI*, King & Gamble, n. sp. A slender twining undershrub; branchlets terete, yellowish, very flexuous. *Leaves* coriaceous, bright green, ovate, bluntly acuminate at apex, rounded and

almost cordate at base; both surfaces glabrous, shining; margins recurved; 2·5 to 4 in. long, 1 to 1·75 in. broad; midrib stout, impressed above, raised beneath, with a large gland at its base; main nerves 5 to 7 pairs, at about 70° with the midrib, nearly straight at first, then often branched, joining an irregular looped intramarginal nerve; secondary nerves many, similar, but not meeting the sinuses of the intramarginal nerve; reticulations irregular, usually branched towards the midrib; petiole slender, ·5 to ·75 in. long. *Cymes* axillary, umbellate, about 5- to 6-flowered, shorter than the petioles; peduncle thick, about ·1 in. long; bracts triangular, small; pedicels ·1 in. long, puberulous; flower-buds conical; flowers yellow. *Calyx* cup-shaped, pubescent without; lobes orbicular, ciliate, ·075 in. long; scales minute. *Corolla* thick, campanulate, almost hypocrateriform; tube cylindric, ·15 to ·2 in. long, glabrous on both surfaces; lobes triangular, valvate, stellately spreading, nearly as long as tube. *Corona* of 5 erect processes adnate to the backs of the anthers, very fleshy, ovate, glabrous, dorsally flattened and concave below, radially flattened and rounded at apex, much longer than the staminal-column. *Staminal-column* short; filament-tube nearly free from the corona; anther-cells parallel; appendages scarious, ovate-acute, incurved over the style-apex; pollen-masses ellipsoid, granular, attached by very slender long curving caudicles to the small conical pollen-carriers. *Style-apex* 5-angled, thick, depressed, with a conical apex. *Fruit* not known.

PERAK: at Relan Tujor, Wray 2243.

## 22. MARSDENIA, Br.

Climbing, rarely erect, shrubs or undershrubs. *Leaves* opposite. *Flowers* small or of moderate size, in umbelliform cymes or in small sessile umbels or clusters scattered along the branches of the cymes or of panicles, which are lateral at the nodes or axillary. *Calyx* 5-partite, with 5 to many glandular scales at the base within, sometimes eglandular. *Corolla* campanulate or urceolate; lobes 5, overlapping to the right. *Corona*-processes 5, membranous or fleshy, arising from the staminal-column, the basal part adnate to it, the apical part free; often of two lobes one above the other. *Staminal-column* arising from or near to the base of the corolla; anthers erect, with membranous appendages more or less incumbent over the style-apex; pollen-masses erect, solitary in each anther-cell, oblong, waxy, attached in pairs by moderately stout caudicles to the ovate horny pollen-carriers. *Ovary* of 2 carpels; style short; style-apex large, usually more or less hollowed above and then expanding into a convex or conical or depressed tip. *Fruit* of 2 (more usually 1 only, by abortion) lanceolate or poniard-

shaped follicular mericarps; pericarp thick, smooth or wrinkled, or sometimes winged. *Seeds* comose.—**DISTRIB.** About 70 species: in the tropics of both hemispheres, one South European.

- Plant turning blue in drying; flowers small, in clusters in a thyrsoid panicle; corolla campanulate, lobes short, with tufts of hair at the mouth; corona-processes subulate-acuminate, longer than the anthers .. .. . 1. *M. tinctoria*.  
 Plant brown when dry; flowers in pedunculate corymbose cymes; corolla tubular-campanulate, lobes linear, glabrous; corona-processes 2-lobed, outer flattened, inner acute, shorter than the anthers .. .. . 2. *M. Scortechinii*.  
 Plant greenish-brown when dry; flowers in clusters in a long spike or raceme; corolla urceolate, lobes lanceolate; corona-processes none or small, and then adnate to the anthers .. 3. *M. thyrsoiflora*.  
 Plant greyish when dry; flowers in pedunculate umbels; corolla rotate, lobes broadly rounded; corona-processes large, round, fleshy, with an acute beak shorter than, or equal to, the anthers .. .. . 4. *M. volubilis*.

1. **MARSDENIA TINCTORIA**, Br. in Mem. Wern. Soc. Edinb. I. 30 (1803).  
 A climbing shrub; stem stout, smooth; branchlets slender, smooth, uppermost pubescent, the whole plant when dry having a blueish-black tinge. *Leaves* membranous when dry; ovate or ovate-oblong, shortly and abruptly acuminate, sometimes long caudate-acuminate at apex, rounded or cordate at base; both surfaces finely pubescent when young, afterwards glabrous; 3 to 9 in. long, 1 to 3 in. broad; midrib slender, usually pubescent, furnished above at the base and partly on the petiole with a group or string of small glands; main nerves 7 to 8 pairs, not conspicuous, straight or slightly curved, usually at about 50° with the midrib; reticulations transverse, slender, obscure; petiole slender, puberulous, .75 to 1.25 and even 2 in. long, twisted and curved in the middle. *Cymes* in densely flowered interrupted clusters along or on the branches of a thyrsoid panicle reaching 3 to 6 in. in length and .5 to 1 in. in diam., grey-puberulous; peduncles .5 to 1.5 in. long; pedicels slender, .15 in. long; buds ovate; flowers yellow, blue when dry. *Calyx*-lobes ovate, pubescent without, ciliate, 3- to 5-nerved, membranous, .05 in. long; glandular scales 5, minute. *Corolla* cylindric-campanulate; tube slightly constricted at mouth, furnished within with 5 lines of retrorse stiff hairs .075 in. long; lobes rounded, erect or spreading in flower, .025 to .05 in. long, each furnished within with a tuft of stiff bristles. *Corona*-processes membranous; the apex subulate-acuminate, longer than the anthers. *Anthems* with membranous incurved appendages; pollen-masses oblong, attached by long somewhat clavate

caudicles to the rather small pollen-carrier. *Style-apex* annular, 5-rayed; the top depressed with a very short umbo. *Follicle* 1, pendulous; linear-lanceolate, 3 in. long, .5 in. in diam., somewhat gibbous at base, acuminate and slightly hooked at tip; pericarp pubescent. *Seeds* compressed, ovate, shortly beaked, .5 in. long, .25 in. broad, with a narrow wing. Wight Contrib. 40, and Icones t. 519; Wall. Cat. 8173; Griff. Notul. IV. 52, and Ic. Pl. Asiat. t. 389; Dene. in DC. Prodr. VIII. 615; Miq. Fl. Ind. Bat. II. 491; Hook. f. Fl. Br. Ind. IV. 34; Brandis For. Fl. 332; Kurz For. Fl. II. 201; Prain Beng. Plants 696. *M. monostachya*, Wall. MSS. *Asclepias tinctoria*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 43. *Pergularia tinctoria*, Spreng. Syst. I. 844. *P. parviflora*, Blume Bijdr. 1056. *Cynanchum tingens*, Hort. Ham.

KEDAH: King's Collector 1731. PERAK: Ridley 9672 (in very young fruit and in some respects slightly different-looking); *Scortechini* 1299.—DISTRIB. India (Sikkim, Assam, and E. Bengal), Burma, Sumatra, Java, Borneo, China.

The description of the fruit requires verification for the Malay Peninsula.

2. *MARSDENIA SCORTECHINII*, King & Gamble, n. sp. A twining shrub; branchlets very slender, pale brown. *Leaves* membranous when dry; ovate, long-acuminate at apex, rounded or cordate at base; both surfaces slightly puberulous when young, afterwards glabrous, brown when dry; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, with a tuft of small glands at the base above the petiole; main nerves 5 to 7 pairs, curving upwards to anastomose near the margin; reticulations many, transverse and netted; petiole slender, .5 to 1 in. long, twisted. *Cymes* axillary between the petioles, pedunculate, corymbose, puberulous, about 1 in. long and broad; peduncles .5 in. long; flowers very many; buds conical-acuminate; pedicels .15 in. long; bracts ovate-acuminate. *Calyx*-lobes oblong, acute, membranous, ciliate, .1 in. long; scales 5, minute. *Corolla* tubular-campanulate; tube .1 in. long, glabrous within; lobes linear-oblong, .15 in. long, glabrous. *Corona*-processes membranous, bifid; outer lobe flattened, rounded; inner erect, acute, shorter than the anther-column. *Anthems* with prominent cells; appendages membranous, acute, erect; pollen-masses large, oblong, attached by rather short caudicles to the rather large ovate, channelled, pollen-carriers. *Style-apex* rounded at top, bearing a rather large dome-shaped apex. *Fruit* not known.

PERAK: at Tjuk, *Scortechini* 1162.

3. *MARSDENIA THYRSIFLORA*, Hook. f. in Fl. Br. Ind. IV. 37 (1883). A climbing shrub; branches pale brown, terete; uppermost branchlets minutely puberulous. *Leaves* membranous; broadly ovate or deltoid-

ovate, acuminate at apex, deeply (often 1 to 1.25 in.) cordate at base, the sinus .5 to .75 in. broad; glabrous on both surfaces on young leaves only, slightly puberulous on the nerves beneath; 4 to 8 in. long, 2 to 6 in. broad; midrib rather broad with a cluster of small glands at its base; main nerves 5 to 7 pairs, the lowest 1 to 2 pairs in the basal lobes deflexed, the others curving upwards to anastomose near the margin; reticulations slender, prominent; petiole 1 to 3.5 in. long, terete. *Cymes* lateral, 4 to 6 in. long, puberulous, spicate or racemose; rachis flexuous, somewhat flattened; flowers in clusters of about 3 to 6 on a tubercular base; bracts small, acute; pedicels slender, .1 in. long; buds ovoid. *Calyx* deeply cleft; lobes ovate-lanceolate, obtuse, the margins hyaline; scales long, subulate. *Corolla* urceolate, glabrous without and within; lobes short, much thickened, lanceolate. *Corona*-processes none, or reduced to a rounded film attached to the back of the anthers. *Stamens* with small spurs to the anthers; appendages long, acuminate, connivent over the style-apex. *Style-apex* 5-lobed, flat, with a fusiform tip. *Follicles* (usually 1 only) lanceolate, 2 in. long, .25 in. broad, recurved, acuminate; pericarp thinly coriaceous, smooth, glabrous. *Seeds* ovate, .2 in. long, .1 in. broad, broadly winged; coma short, white-silky; testa very thin, pale brown; cotyledons elliptic, .025 in. long; radicle as long as cotyledons. Prain Beng. Plants 696. *M. tinctoria* in part, Herb. Hook. f. and Th.

PAHANG: at Talian river, *Ridley* 2414.—DISTRIB. India (Assam, Khasia Hills, jheels of Lower Bengal).

4. *MARSDENIA VOLUBILIS*, T. Cooke, Fl. Bomb. II. 166 (1904). A stout climbing shrub with rough brown corky bark; branchlets pale brown with occasional lenticels; innovations whitish-puberulous. *Leaves* somewhat coriaceous when fresh, membranous when dry; broadly ovate or suborbicular, acuminate at apex, cordate or truncate or rounded, occasionally slightly cuneate at base; young leaves minutely tomentose, especially on the under surface, afterwards glabrous, ashy grey when dry; 2.5 to 6 in. long, 1.75 to 4.5 in. broad; midrib stout, raised beneath, furnished with a few small glands in a cluster at the base adjoining the petiole; main nerves also raised beneath, 4 to 6 pairs, the lowest 2 pairs from close by the base, spreading and curving upwards; reticulations prominent, usually raised, larger ones transverse; petiole .5 to 1.5 in. long, stout or slender. *Cymes* umbellate, glabrous or mealy-pubescent, many-flowered; peduncles 1 to 2 in. long, slender, arising from between the petioles; bracts ovate-acuminate, sometimes leafy; pedicels slender, .25 to 1 in. long; buds globose, depressed; flowers bright green. *Calyx*-lobes ovate-oblong, obtuse, ciliolate, .1 in. long; glandular scales 5, minute, between the lobes. *Corolla* rotate,

deeply divided; tube .1 to .15 in. long; lobes rounded, rather longer, glabrous without and usually within. *Corona*-processes large, fleshy, rounded, with a short beak extending over the top of the staminal-column and style-apex. *Staminal-column* arising from the base of the corolla; appendages membranous, ovate, obtuse, arching over the stigma; pollen-masses oblong-spathulate, large, waxy, attached by short thick caudicles to the linear-oblong pollen-carriers. *Ovary* of 2 pubescent carpels; style-apex dome-shaped. *Follicles* 2 (or 1, by abortion), broadly lanceolate, tapering to a blunt point, divaricate in a straight line, 3 to 4 in. long, 1 in. broad; pericarp smooth, yellow, mealy when young. *Seeds* broadly ovate, .5 in. long, .3 in. broad, broadly winged; the tip truncate, with a 2 in. long coma of white silky hairs; testa smooth, shining; cotyledons ovate, .3 by .2 in., flat; radicle .1 in. long. *Dregea volubilis*, Benth. Gen. Pl. 775 ex Hook. f. Fl. Br. Ind. IV. 46; Trimen Fl. Ceyl. III. 161; Prain Beng. Plants 697. *Hoya viridiflora*, Br. in Mem. Wern. Soc. Edinb. I. 27; Wight Contrib. 39, and in Hook. Bot. Misc. II. 98, t. 1, and Ic. t. 586; Wall. Cat. 8168; Dalz. & Gibs. Bomb. Fl. 153; Griff. Ic. Pl. Asiat. t. 387, 388. *Asclepias volubilis*, Linn. f.; Roxb. Fl. Ind. ii. 36. *Apocynum tiliaefolium*, Lamk. Encycl. I. 214. *Wattakaka viridiflora*, Hassk. in Flora 1857, 79. "*Watta-kaka-codi*," Rheede Hort. Mal. IX. t. 15.

SIAMESE STATES: Pulau Badak, Curtis 2997.—DISTRIB. India, Ceylon, Java.

The only Malay specimen available is a poor one, with small umbels and flowers smaller than in the usual Indian forms, but the structure agrees with the latter.

### 23. PERGULARIA, Linn.

Twining shrubs. *Leaves* opposite. *Flowers* of moderate size, numerous, in pedunculate or sessile umbelliform cymes, lateral between the bases of the petioles. *Calyx* 5-partite; scales within 5 or none. *Corolla* hypocrateriform; tube inflated at the base; lobes 5, erect, overlapping to the right. *Corona* of 5 erect processes arising from the base of the staminal-column and adnate to it in the lower part, free above and with a narrow or subulate process on the inner face. *Staminal-column* arising from the base of the corolla; anthers oblong, erect, with long erect membranous appendages conniving over the apex of the style; pollen-masses solitary in each anther-cell, erect, attached in pairs to the pollen-carriers by very short caudicles. *Ovary* of 2 carpels; style not exceeding the anther-appendages; style-apex stout, ovoid-pentagonal. *Follicles* lanceolate, terete, rather turgid. *Seeds* ovate, concave, comose.—DISTRIB. About 10 species, chiefly Indian and Malayan, one in Tropical and South Africa.

PERGULARIA PUBERULA, Miq. Fl. Ind. Bat. II. 495 (1856). A twining shrub; branchlets slender, terete, puberulous as are the innovations. *Leaves* membranous; ovate or oblong-ovate, acuminate at apex, rounded or shallowly cordate at base, puberulous when young, when older only on the nerves; 3 to 5 in. long, 2 to 3 in. broad; midrib slender, with a tuft of minute glands at the base above the petiole; main nerves 6 to 7 pairs, the lowest 2 pairs rather close together, the rest distant, curving upwards to anastomose near the margin; reticulations transverse, prominent on the lower surface; petiole slender, puberulous, 1 to 1·5 in. long. *Cymes* umbelliform, in pairs on the top of a ·5 to 2 in. long peduncle, puberulous, many-flowered; bracts minute, subulate; pedicels slender, ·25 to ·5 in. long; buds oblong-conical. *Calyx* membranous; lobes ovate-obtuse, unequal, ·05 to ·1 in. long, puberulous, ciliate on the margins; scales obscure. *Corolla* pubescent without; tube ·25 in. long, inflated below, slightly contracted at the mouth; lobes linear-oblong, obtuse, hispidly ciliate, as long as tube. *Corona*-processes laterally compressed, 2-winged below, beaked above, the inner face with a subulate curved appendage arching over the anthers and longer than them. *Pollen*-masses oblong, obtuse, attached a little above their bases by very short stout caudicles to the bifid pollen-carriers. *Style-apex* rounded-conical. *Fruit* not known. Hook. f. Fl. Br. Ind. IV. 38.

PENANG: *Phillips*; at Penara Bakit, *Curtis* 932.—DISTRIB. Java (*Horsfield, Kurz*).

*P. minor*, Andr. Bot. Rep. t. 184, is a garden species found in cultivation in India and Malaya, and prized for its greenish-yellow scented flowers. Its native home is uncertain. MALACCA: *Griffith*.

## 24. STEPHANOTIS, Thouars.

Twining shrubs, often long-scandent. *Leaves* opposite, coriaceous. *Flowers* in umbelliform axillary pedunculate cymes, usually large, white and sweet-scented. *Calyx* 5-partite, with large lobes; glandular scales usually none. *Corolla* hypocrateriform; tube long, cylindric, inflated at the base; lobes twisted, overlapping to the right. *Corona* of 5 processes, adnate to the back of the anthers, flattened, sometimes none. *Staminal-column* arising from the base of the corolla; anthers erect, with erect or inflexed membranous appendages; pollen-masses solitary in each anther-cell, erect, attached in pairs to the carriers by very short caudicles. *Ovary* of 2 carpels; style short; style-apex conical or shortly beaked, hardly or not exserted. *Fruit* of 2 very thick, obtuse or acuminate, follicular mericarps. *Seeds* comose.—DISTRIB. About

15 species, chiefly from Madagascar, a few from the Malay Archipelago and China.

*STEPHANOTIS MAINGAYI*, Hook. f. Fl. Br. Ind. IV. 39 (1883). A stout, long-scandent, climbing shrub; branchlets stout, pale brown, puberulous with retrorse curved tubercular hairs. *Leaves* coriaceous, chartaceous when dry; ovate or ovate-oblong, acuminate at apex, shortly cordate at base; both surfaces glabrous and yellow when dry; margins recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib slender but prominent, raised beneath; main nerves 8 to 10 pairs, the lowest pair nearly at right angles to the midrib, the rest at about 45°, nearly straight, joining towards the margin in a looped intramarginal nerve; reticulations distant, transverse; petiole pubescent, .5 to 1 in. long; *Cymes* few-flowered; peduncle 1 to 3 in. long, stout; bracts small, subulate-acuminate; pedicels stout, puberulous, .75 to 1.5 in. long; buds elongate-clavate; flowers pale sulphur-yellow, large, fragrant, 2.5 in. in diam. *Calyx* glabrous, except at extreme base; tube very short; lobes oblong-lanceolate, acute, 3-nerved with netted reticulations, .75 in. long, .3 in. broad; scales none. *Corolla*-tube 1 in. long, thick, with 5 thick ridges within opposite the anthers, the hollows between the ridges filled with brown stiff retrorse bristles; lobes slightly longer than the tube or equal to it, ovate-lanceolate, acuminate, spreading. *Corona* none. *Staminal-column* in all .5 in. long, stout, on a thickened base; anther-wings horny; appendages pale, oblong, obtuse; pollen-masses oblong, with very short scarcely apparent caudicles. *Style-apex* capitate, flattened, on a short column supported by a thickened ring. *Fruit* not known.

MALACCA: climbing extensively over trees, *Maingay* (K.D.) 1112. SINGAPORE: *Hullett* 147.

## 25. TYLOPHORA, Br.

Erect or twining perennials. *Leaves* opposite. *Flowers* small, lateral between the bases of the petioles or axillary, in simple or branched cymes of flower-clusters or short racemes, or sometimes in sessile flower-clusters at the nodes of the stem. *Calyx* 5-partite, 5-glandular within. *Corolla* rotate or rotate-campanulate, deeply 5-lobed, the lobes slightly overlapping to the right. *Corona* of 5 small fleshy tubercular processes, adnate to or radiating from the filament part of the staminal-column and arising from near its base. *Staminal-column* arising from the base of the corolla; anthers erect, small, with small membranous appendages; pollen-masses very minute, erect, sub-erect or horizontal, attached by their middle or near their base to very slender caudicles by which they are affixed in pairs to the pollen-



carriers. *Ovary* of 2 carpels; style-apex pentagonal or 5-lobed, depressed, flattened or convex, rarely slightly exceeding the anthers. *Fruit* of 2 (or by abortion 1) follicular mericarps, smooth, acute or acuminate, sometimes inflated or winged. *Seeds* comose.—**DISTRIB.** About 40 species: widely distributed in the tropical and subtropical regions of the Old World and Australia.

Leaves and branches and cymes glabrous; corona-processes globose, without free points above; calyx glabrous:—

Flowers rather large, .3 in. broad at least; leaves usually over 2 in. long:—

Corona-processes globose, shorter than the anthers; leaves 2.5 to 6 in. long .. .. . 1. *T. longifolia*.

Corona-processes globose, as long as the anthers; leaves 1 to 3 in. long .. .. . 2. *T. globifera*.

Flowers very small, .1 in. broad; leaves under 2 in. long .. 3. *T. tenuis*.

Branches and inflorescence more or less pubescent; calyx pubescent:—

Corona-processes globose, without free tips above; foliicles where known slender, acuminate:—

Leaves glabrous; corolla very small .. .. . 4. *T. exilis*.

Leaves tomentose; corolla about .3 in. broad .. .. . 5. *T. hirsuta* var. *penangensis*.

Corona-processes with small free points above; foliicles broad, ventricose, obtuse:—

Leaves 3 to 6 in. long, not or very slightly cordate at base.. 6. *T. Wallichii*.

Leaves 5 to 7 in. long, deeply cordate at base .. .. . 7. *T. perakensis*.

1. **TYLOPHORA LONGIFOLIA**, Wight Contrib. 50 (1834). A slender twiner; stems pale brown, glabrous, striate when dry. *Leaves* membranous when dry; ovate-lanceolate or oblong-lanceolate, acuminate at apex, rounded or slightly cordate at base; glabrous on both surfaces; 2.5 to 6 in. long, .75 to 1.75 in. broad; midrib slender, raised beneath, with a tuft of minute glands at the base just above the petiole; main nerves 7 to 8 pairs, the lowest 2 pairs close to the base, the rest sharply curved upwards to and along the margin, all raised beneath; reticulations scanty, transverse; petiole slender, .5 to .75 in. long, pubescent in the channel on the upper surface. *Cymes* paniculate, glabrous, lateral between the leaf-petioles, up to 4 in. long; peduncles slender, 1 to 2 in. long; branches divaricate, slender; flower-clusters distant, umbellate, 2- to 5-flowered; pedicels capillary, .2 to .3 in. long; buds ovoid; flowers rather large, up to .4 in. in diam., yellowish-green or -red. *Calyx* glabrous; lobes lanceolate, .025 in. long; scales minute. *Corolla* rotate; tube very short; lobes oblong-lobtuse, 5- to 7-nerved, membranous, .1 in. long. *Corona*-processes dilated, globose, shorter

than the anthers. *Anthers* broad; appendages short, incurved; pollen-masses ovoid, horizontal, attached by minute straight caudicles to the slightly spurred pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, tip convex. *Follicles* 2, divaricate at right angles, lanceolate, poniard-shaped, long-acuminate, 3·5 to 4·5 in. long, ·25 in. broad; pericarp thin, smooth. *Seeds* oblong, broadly winged, ·4 to ·5 in. long, ·15 to ·2 in. broad, base rounded; tip broadly truncate, bearing a white silky coma 1·5 in. long; testa thin, dark brown, smooth; cotyledons elliptic, ·075 in. long, nerved; radicle cylindric, ·05 in. long. Wall. Cat. 8205; Dcne. in DC. Prodr. VIII. 608; Hook. f. Fl. Br. Ind. IV. 42.

PERAK: on Maxwell's Hill, 3500 ft., *Wray* 4185; do. *Ridley* 5514; *Scortechini*; at 3500 to 4000 ft., *King's Collector*, 3317, 3318, 6301; at Cottage Hill, 4000 to 6000 ft., *Curtis* 145, 2087.—DISTRIB. India (Sikkim, Khasia Hills, Sylhet).

2. *TYLOPHORA GLOBIFERA*, Hook. f. Fl. Br. Ind. IV. 41 (1883). A slender, glabrous, twining undershrub; branchlets glabrous, terete. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or slightly cordate at base; both surfaces glabrous, smooth; margins slightly recurved; 1 to 3 in. long, ·5 to 1·5 in. broad; midrib slender, raised beneath; main nerves 4 to 7 pairs, at first nearly straight, then curving to join in an intramarginal looped nerve; petiole ·25 to ·5 in. long, slender. *Cymes* long-peduncled, compressed, few-flowered, more or less umbellate; peduncles about 1 in. long; bracts lanceolate-acuminate; pedicels filiform, ·5 to ·75 in. long; buds ovoid, depressed; flowers blue (*Kunstler*). *Calyx* glabrous; lobes ovate-lanceolate, ·1 in. long. *Corolla* ·3 in. in diam., cleft half-way down; lobes ovate, ·15 in. long, prominently nerved. *Corona*-processes globose, large, as high as the anthers. *Anther*-appendages short, crenate, incurved over the style-apex; pollen-masses ellipsoid, horizontal, joined by straight caudicles to the small oblong pollen-carriers. *Style-apex* 5-lobed; tip convex. *Fruit* not known.

PERAK: banks of Bernam river, *King's Collector* 8853. MALACCA: *Griffith* 3764.—DISTRIB. Andaman Islands, Borneo.

3. *TYLOPHORA TENUIS*, Blume Bijdr. 1062 (1826). A slender twiner; stems much branched, very slender, glabrous; the nodes pubescent, the internodes sometimes only. *Leaves* somewhat fleshy when fresh, membranous when dry; variable in shape, ovate-elliptic or -oblong or -lanceolate, acute or apiculate at apex, rounded or slightly cordate at base; margins recurved; ·75 to 2 in. long, ·25 to 1 in. broad; midrib slender, puberulous above; main nerves 4 to 5 pairs, indistinct, nearly straight to join an intramarginal looped nerve; reticulations obscure;

petioles .25 to .5 in. long, puberulous in the channel on the upper side. *Cymes* from between the petioles, very slender, paniculate, glabrous, reaching 4 to 5 in. in length; rachis filiform, flexuose, its branches divaricate, finally bearing few-flowered subumbellate racemes; pedicels filiform, .25 to .5 in. long; bracts minute, lanceolate-subulate; buds globose; flowers dark purple. *Calyx* glabrous; lobes lanceolate, .025 in. long. *Corolla* rotate; tube short; lobes ovate-oblong, obtuse, 3-nerved. *Corona*-processes inflated, somewhat annular-globose, as long as the filaments. *Anthers* slender; appendages very short, incurved; pollen-masses minute, horizontal, ovoid, attached by straight caudicles to the rather slender pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, top convex. *Follicles* 1 or 2, 2 to 3 in. long, lanceolate, poniard-shaped, long-acuminate; pericarp membranous, smooth. *Seeds* ovate, .2 to .25 in. long, broadly winged, dentate below, truncate at tip, and bearing a white silky coma .75 to 1 in. long; testa dark brown, striate, sparsely tubercular; cotyledons elliptic, radicle cylindric, both together .05 to .1 in. long. Dene. in DC. Prodr. VIII. 608; Miq. Fl. Ind. Bat. II. 488; Hook. f. Fl. Br. Ind. IV. 42; Trimen Fl. Ceyl. III. 158; Cooke Fl. Bomb. II. 162; Prain Beng. Plants 698. *T. carnos*a, Wall. in Wight Contrib. 49; Wall. Cat. 8200; Wight Ic. t. 351; Dene. in DC. l. c. 607; Miq. l. c. 488. *T. tenuissima*, Wight Contrib. 47, and Ic. t. 588; Dalz. & Gibs. Bomb. Fl. 150; Dene. in DC. l. c. 607. *Asclepias tenuissima*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 41. *A. dichotoma*, Rottl. in Wall. Cat. 8200 B.C. *Ceropegia Decaisneana*, Miq. Pl. Hohenack. 634.

PENANG: Curtis 1526. PERAK: Wray 2125; Scortechini; King's Collector 6099, 10600. MALACCA: Griffith; Maingay (K.D.) 1108, 1139. JOHORE: Ridley 4030, 9162. SINGAPORE: Ridley 5746; Kunstler 113, 266.—DISTRIB. India, Burma, Ceylon, Java, Borneo (Haviland 3060).

4. TYLOPHORA EXILIS, Colebr. in Trans. Linn. Soc. XII. 358, t. 16 (1817). A slender twiner; branchlets pale brown, terete, slender, puberulous. *Leaves* chartaceous when dry; ovate-oblong or -lanceolate, shortly and abruptly acuminate at apex, rounded at base; glabrous on both surfaces; margins recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, impressed above, raised beneath, with a few minute glands at its base; main nerves 4 to 6 pairs, the lowest 2 pairs close together, the rest distant, curving upwards to meet in a looped intramarginal nerve raised above; secondary nerves few; reticulations obscure; petiole slender, .5 to 1 in. long, articulate at the base. *Inflorescence* longer than the leaves, up to 4 in. long, puberulous; rachis slender, flexuous, simple or rarely branched, bearing at its nodes umbellately racemose flower-clusters, the clusters many-flowered; bracts

minute, persistent; pedicels slender, .1 to .15 in. long; buds very small, globose; flowers light brown. *Calyx* pubescent without; lobes ovate acute, ciliate, .04 in. long; scales minute. *Corolla* rotate, very small, glabrous, membranous; lobes .05 in. long, 3-nerved. *Corona*-processes inflated, obtuse, shorter than the anthers. *Anthers* slender; appendages short, membranous; pollen-masses ovoid, attached by very short straight caudicles to the minute slightly spurred pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal, flat, very slightly convex at tip, *Follicle* 1, subulate, acuminate, 3 to 4 in. long, .25 in. broad; pericarp chartaceous, smooth, glabrous. *Seeds* ovate-oblong, .25 to .35 in. long, .1 in. broad, slightly contracted above below the broad truncate tip, which bears a white silky coma .75 to 1 in. long, denticulate at base, broadly winged; testa brown, thin, shining, striate; cotyledons elliptic, .1 in. long, 3-nerved; radicle cylindric, .05 in. long. Wight Contrib. 50; Wall. Cat. 8206; Dene. in DC. Prodr. VIII. 608; Hook. f. Fl. Br. Ind. IV. 44; Prain Beng. Plants 698. *Pergularia exilis*, Spreng. Syst. I. 844.

PERAK: at Kota, Wray 2417, 3053; King's Collector 6470. DINDINGS: on Pangkore Island, *Scortechini* 1035. MALACCA: Griffith 3764.—  
DISTRIB. India (Assam, Sylhet, Chittagong).

5. TYLOPHORA HIRSUTA, Wight Contrib. 49 (1834); Wall. Cat. 8201; Dene. in DC. Prodr. VIII. 607; Hook. f. Fl. Br. Ind. IV. 43. *T. Jacquemontii*, Dene. l. c. *Gymnema hirsutum*, Wall. Tent. Fl. Nep. 50.—DISTRIB. India (Himalaya from Kumaon eastwards, Eastern Bengal).

VAR. *penangensis*, Hook. f. in Fl. Br. Ind. IV. 43. A climbing shrub; branchlets densely ferruginous tomentose. *Leaves* subcoriaceous; ovate or ovate-lanceolate, acuminate at apex, attenuate, rounded, or somewhat cordate at base; both surfaces ferruginous-tomentose; the hairs with bulbous bases; 2 to 4 in. long, 1 to 1.75 in. broad; midrib rather stout; main nerves 4 to 6 pairs, curved upwards to and along the margin; reticulations netted; petiole .5 to .75 in. long, densely tomentose. *Cymes* ferruginous-villous, much branched, 1 to 5 in. long; branches dichotomous; flowers in racemiform clusters on enlarged many-bracteate rachises; bracts ovate-acuminate; pedicels very slender, .25 to .5 in. long. *Calyx*-lobes pubescent, very small, .3 in. long, ovate-acute. *Corolla* deeply cleft; lobes triangular-ovate, acute, .1 in. long. *Corona* of 5 subglobose processes on the backs of the anthers and shorter than them. *Anther*-appendages short, incurved; pollen-masses nearly globose, horizontal, attached by slender slightly curved caudicles to the oblong pollen-carriers. *Style-apex* 5-angled, included within the anthers. *Fruit* not seen. *T. mollissima*, Wall. Cat. 8202.

PENANG: *Phillips*; at Waterfall stone-quarry, *Curtis*.—DISTRIB. China? *Wallich* 8202 (cult. in Hort. Calc.).

After examining specimens at Kew, we prefer to leave this plant in its present rather doubtful position, rather than to accept the suggestion in Fl. Br. Ind. that it may be *T. villosa*, Blume, of Java. Its place will probably have to be reconsidered when better specimens are available.

6. *TYLOPHORA WALLICHII*, Hook. f. Fl. Br. Ind. IV. 45 (1883). A slender twining shrub; branchlets slender, terete, younger puberulous. *Leaves* thickly coriaceous when green, chartaceous when dry; ovate-lanceolate or ovate-oblong, acuminate at apex, rounded or slightly cordate at base; both surfaces glabrous except the nerves beneath when young; margins slightly recurved; 3 to 6 in. long, .5 to 2 in. broad; midrib rather stout, raised beneath, with a few minute glands at the base above the petiole; main nerves 6 to 8 pairs, curving upwards to join in a rather obscure intramarginal looped nerve; reticulations transverse, obscure; petiole slender, puberulous, .75 to 1 in. long, articulate at the base. *Inflorescence* lateral from between the bases of the petioles, often longer than the leaves, divaricately branched, subsessile or on peduncles .5 to .75 in. long; branches slender, long; flower-clusters racemose, pubescent, with many minute ovate-acute sheathing persistent bracts; pedicels capillary, .3 to .4 in. long, pubescent; buds globose; flowers pale yellow. *Calyx* membranous; lobes ovate-oblong, acute, .5 in. long, ciliate, pubescent without; scales minute. *Corolla* rotate-campanulate; tube .05 in. long; lobes ovate-oblong, acute, .1 in. long, thin, 5-nerved. *Corona*-processes thick, rounded, fleshy, ending in a cuspidately acute point, reaching to the level of the style-apex. *Anthers* narrow; appendages very short; pollen-masses very minute, nearly globose, attached by very slender straight caudicles to the minute pollen-carriers. *Style-apex* pentagonal; top convex. *Follicle* 1, recurved to the horizontal, 3.5 to 4 in. long, 1 in. broad, oblong-ellipsoid ventricose, obtuse at the tip; pericarp light green, pale brown and chartaceous when dry and longitudinally striate. *Seeds* flattened, .5 in. long, broadly ovate, with a broad wing; testa brown, shining; tip truncate, bearing a 1 in. long white silky coma; cotyledons broadly ovate, 3-nerved, .15 to .2 in. in diameter; radicle cylindric, .075 in. long. *Gymnema Wallichii*, in part, Wight Contrib. 46. *G. sagittatum*, Wall. Cat. 8194b.

PENANG: in Pulau Betong Reserve, *Curtis* 933. PERAK: *Wray* 3047; *King's Collector* 5259, 5439. MALACCA: *Griffith*; *Maingay* (K.D.) 1142. SINGAPORE: *Wallich* 8194b.

7. *TYLOPHORA PERAKENSIS*, King & Gamble, n. sp. A climbing shrub; branches stout, fleshy; branchlets smooth, striate, pale brown

when dry; internodes long. *Leaves* membranous when dry; ovate, acuminate at apex, deeply cordate at base; glabrous on both surfaces; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, raised beneath, bearing a small cluster of glands at the base just above the petiole; main nerves 9 to 10 pairs, the lowest 1 or 2 pairs decurved into the basal lobes, the rest curving upwards to anastomose near the margin in an obscure looped nerve; reticulations few, transverse, prominent when dry; petiole fleshy, glabrous, 1 to 3 in. long, articulate at the base. *Inflorescence* lateral from between the petioles, as long as or longer than the leaves, divaricately branched, glabrous; peduncles stout, 1 to 1.5 in. long; branches long, slender; flower-clusters umbellate, 6- to 8-flowered; bracts minute, usually soon deciduous; pedicels capillary, .1 to .2 in. long; buds ovoid; flowers green. *Calyx* pubescent without; lobes ovate-acute, .075 in. long, ciliate; scales subulate. *Corolla* campanulate-rotate; tube short; lobes oblong-obtuse, 5-nerved, thickened, minutely pubescent above. *Corona*-processes nearly globose, fleshy, shorter than the anthers; point small, appressed to the anthers, acute. *Anthers* slender above; appendages acuminate, incurved; pollen-masses nearly globose, very minute, attached by slender straight caudicles to the minute pollen-carriers. *Style-apex* pentagonal, top convex. *Follicle* 1, ventricose, only slightly recurved, 5 to 6 in. long, 1.5 in. broad, oblong, very obtuse at tip; pericarp light green and glossy when fresh, chartaceous when dry, striate longitudinally; dissepiments fibrous-crustaceous. *Seeds* flattened, .5 in. long, broadly ovate, with a broad wing; testa brown, shining; tip with a .75 in. long white silky coma; cotyledons broadly ovate, 3-nerved, .15 in. long; radicle cylindric, .075 in. long.

PERAK: at lower camp, Gunong Batu Pateh, 3400 ft., *Wray* 1227; in open jungle at 200 to 300 ft., *King's Collector* 5761, 7178, 8343; at Ipoh, *Curtis* 3186.—DISTRIB. Borneo (*Teysmann* 11578; *Motley* 625).

This species comes very near to *T. Wallichii*, but is much larger and more glabrous, has more deeply cordate leaves, a larger inflorescence with umbellate instead of racemose flower-clusters, a less beaked corona and longer anther-appendages. *Curtis*' No. 3186 has one inflorescence with the flower-clusters racemose and the others umbellate, and seems to come between the two species, but in other respects it belongs to this.

## 26. HETEROSTEMMA, W. & A.

Twining shrubs. *Leaves* opposite, often 3- to 5-nerved at the base. *Flowers* small, in lateral sessile or pedunculate umbellate or racemose cymes. *Calyx* 5-partite. *Corolla* campanulate, urceolate or rotate; lobes triangular, valvate or slightly overlapping to the right. *Corona*

of 5 thin or fleshy processes spreading more or less horizontally from the staminal-column, usually with an erect tubercle on the upper side; the tips flat or dentate or laciniately cleft. *Staminal-column* short, depressed; the anthers minute, ending in a small membranous appendage; pollen-masses 1 in each anther-cell, subquadrate or rounded, sometimes with a thin margin on the inner side, erect, sessile or attached by very short caudicles to the pollen-carriers. *Ovary* of 2 carpels, distinct or combined; style-apex pentagonal, flat, not exserted beyond the anthers. *Fruit* of 2 distinct or adherent slender straight follicular mericarps. *Seeds* thin, winged, comose; the margin recurved.—**DISTRIB.** About 10 species, Indian and Malayan.

Corolla rotate-campanulate; corona thin, long, entire or laciniate, spreading horizontally; leaves truncate or cordate at base .. 1. *H. piperifolium*.  
Corolla ovoid-urceolate; corona thick, short, much fimbriate, more or less erect; leaves cuneate at base .. 2. *H. fimbriatum*.

1. **HETEROSTEMMA PIPERIFOLIUM**, King & Gamble, n. sp. A slender twining shrub; branchlets pale, terete, slightly channelled when dry, uppermost very minutely puberulous. *Leaves* membranous when dry, 3- to 5-nerved; triangular-ovate, acuminate at apex, broadly truncate at base, sometimes slightly decurrent; both surfaces minutely puberulous, the lower the most; 2·5 to 3·5 in. long, 1·5 to 2·5 in. broad; midrib slender, furnished at the base with 1 or more rather conspicuous glands; main nerves 4 pairs, the lowest 2 pairs from the base, the first pair very small, the second strong and with the others curving upwards to join near the margin; reticulations few, obscure, irregular; petiole slender, twisted, .75 to 2 in. long. *Cymes* few-flowered, umbellately racemose, on stout .5 to .75 in. long peduncles; the rachis of the raceme thickened, with minute bracts; pedicels slender, .25 in. long; buds globose, depressed; flowers yellow. *Calyx*-lobes ovate, .05 in. long, ciliate, the margins hyaline; scales minute. *Corolla* rotate-campanulate, .3 in. broad, puberulous without, the base short at first, then spreading, divided about half-way down; lobes triangular, incurved. *Corona*-processes spreading, lying flat on the corolla, .1 in. long, linear-lanceolate, entire or variously laciniate, the upper part with a slight rounded protuberance or nearly flat. *Staminal-column* short; appendages membranous, curved over the style-apex; pollen-masses erect, waxy, flattened on the inner, curved on the outer edge, sessile on the triangular-elongate pollen-carrier. *Carpels* distinct; style-apex thin, flattened, 5-gonal. *Follicles* slender, long-acuminate, recurved to about 3 right angles, 4 to 5 in. long, .15 to .2 in. broad; pericarp thin, smooth. *Seeds* ovate-oblong, very thin, with broad thin margins; apex bearing a .75 in. long white silky coma; testa very thin, brown.

PERAK: at Kwala Dipang, *Ridley* 9619; at Larút, 200 to 500 ft., *King's Collector* 2338, 7973; at Ijuk, *Scortechini* 1097, 1150.

At first sight this species closely resembles *H. chrysanthum* (*Symphysicarpus chrysanthus*, Hassk.), but differs completely in the corona and in the very divaricate follicles.

VAR. *cordatum*, King & Gamble. *Leaves* cordate to a depth of about .4 in.; main nerves 5 to 6 pairs, the basal pairs 3, of which the lowest much deflexed in the lobes of the leaf. *Corona*-lobes usually entire. Rest as in the type.

PERAK: *Scortechini*. Only one rather poor specimen of this is available.

2. *HETEROSTEMMA FIMBRIATUM*, King & Gamble, n. sp. A twining shrub; stems pale brown, with 2 longitudinal lines of hairs. *Leaves* fleshy, chartaceous when dry; oblong or oblong-lanceolate, acuminate at apex, cuneate at base; both surfaces glabrous, lower pale; margins slightly recurved; 3.5 to 4.5 in. long, 1.5 to 2 in. broad; midrib stout, raised beneath when dry, furnished with a cluster of rounded glands at the base above the petiole; main nerves 5 pairs, prominent and raised when dry, with a slender obscure pair in addition from the very base, the second pair from about .25 in. above the base, all obliquely curved upwards to join in a looped intramarginal nerve; reticulations not visible even when dry; petiole stout, .5 to .75 in. long, much curved and swollen at the base. *Cymes* racemose, on short (.15 in.) very stout peduncles; the rachises of the racemes about .3 in. long, thick, strobilate, with cushion-like bracts; pedicels slender, angular, .5 in. long, puberulous; buds rather large, ovoid-orbicular. *Calyx* very small; lobes minute, ovate-acute, ciliate. *Corolla* ovoid-urceolate, thick, fleshy, pubescent without, glabrous within, .3 to .4 in. long, divided at most to one-third of its length in triangular lobes slightly overlapping to the right and erect. *Corona*-processes nearly erect, attached to the staminal-column, thick, fimbriate at the tips in 2 rows of subulate teeth. *Staminal-column* short; anther-cells rounded; appendages very small, membranous, bifid; pollen-masses rounded, with a thin straight margin on the inner side, nearly horizontal, sessile on a triangular pollen-carrier. *Carpels* distinct, elongate; style-apex 5-gonal, tip concave. *Fruit* not known.

PERAK: at G. Ijub, *Scortechini* 1220.

Only one rather poor specimen of this is available. The plant seems to be an *Oianthus*; but that genus—as suggested by Hooker in the Fl. Br. Ind., and by Bentham in his remarks to Ic. Pl. t. 1191, under *O. urceolatus*, Benth., to which this species is very close—seems scarcely separable from *Heterostemma*. In many ways our species strongly resembles *H. alatum*, Wight.



27. HOYA, Br.

Twining pendulous (rarely erect) or rambling and rooting, often epiphytic, shrubs. *Leaves* opposite, usually thick and fleshy or coriaceous. *Flowers* in axillary, lateral or terminal, umbelliform, racemose cymes, usually on a thickened tuberculate rachis, sessile or pedunculate. *Calyx* small, 5-partite, with 5 glandular scales. *Corolla* rotate or rotate-campanulate, fleshy or waxy; lobes 5, often convex or spreading or reflexed, valvate in bud. *Corona*-processes 5, large, fleshy-membranous or horny, adnate to the staminal-column; the lower lobe stellately spreading or ascending, turgid or compressed, often concave on the upper surface; the upper lobe usually produced into a tooth or process which is erect and incumbent on the anther. *Staminal-column* usually short, arising from the base of the corolla; anthers conniving over the style-apex, membranous; appendages membranous, erect or inflexed; pollen-masses 1 in each anther-cell, erect, waxy, usually flattened, often thickened on the outer margin, attached by caudicles of various shapes, usually short, sometimes enlarged thickened or cup-shaped, sometimes long, to the horny hard pollen-carriers. *Ovary* of 2 distinct carpels; style-apex 5-angled, tip flattened or conical-apiculate. *Fruit* of 1 or 2 follicular mericarps, usually slender with a thin pericarp, rarely turgid with a thick one. *Seeds* small, oblong or ovate, comose; cotyledons flattened, thick; radicle cylindric.—DISTRIB. About 70 species, found in Tropical Asia and Australia.

Corolla reflexed, lobes longer than broad :—

Staminal-column stipitate; corona-processes with long narrow lobes, the upper erect, the lower horizontal with usually upcurved tip (Sect. I. CYRTOCERAS) .. .. 1. *H. multiflora*.

Staminal-column sessile; corona-processes inflated :—

Corona-processes with lower lobe ovoid, laterally compressed; upper lobe, smaller, rounded, erect; corolla-tube densely villous (Sect. II. PTEROSTELMA) .. .. 2. *H. lasiantha*.

Corona-processes with lower lobe globose, hollow; upper shorter-curved; corolla-tube with a broad annular ring (corolline corona ?) (Sect. III. KLOIOPHORA) .. .. 3. *H. Curtisii*.

Corolla spreading, lobes spreading or incurved, rarely reflexed, broader than long; staminal-column sessile or subsessile; corona-processes with lower lobes spreading, upper acute (Sect. IV. EUHOYA) :—

Corona with lower lobes of processes obtuse :—

Lower lobes suberect, laterally compressed; leaf-nerves horizontal :—

Lower lobes rounded, inflated; upper lobes acuminate; stems thick; leaves thick, fleshy, over 4 in. long :—

Flowers yellow; corolla under 1·5 in. in diam. .. 4. *H. obtusifolia*.

- Flowers dark purple; corolla much over 1·5 in. in diam. 5. *H. imperialis*.  
 Lower lobes beaked; upper lobes short, acute; stems slender; leaves thin, under 4 in. long .. 6. *H. elliptica*.  
 Lower lobes horizontal or nearly so, flattened above; leaf-nerves usually at an acute angle with the midrib:—  
 Flowers large, reaching 1·5 in. in diam.; leaves velvety pubescent beneath; caudicles of pollen-masses long, slender, twisted .. 7. *H. coronaria*.  
 Flowers small, rarely ·5 in. in diam.; leaves glabrous beneath; caudicles short, usually thick:—  
 Lower lobe of corona very thick and blunt vertically, upper short; leaves ovate-lanceolate, cordate, faintly nerved .. 8. *H. Scortechinii*.  
 Lower lobe of corona thin vertically, short:—  
 Leaves obscurely nerved, about 3 to 4 pairs, very thick; lower corona-lobes obtuse; upper long, acuminate; appendages very long acuminate .. 9. *H. caudata*.  
 Leaves prominently 3- to 5-nerved, very thick; peduncles many from the axils; lower corona-lobes concave, obtuse .. 10. *H. latifolia*.  
 Leaves not 3-nerved from the base; peduncles usually 1 only at the axils:—  
 Leaves small; main nerves at right angles to the midrib, indistinct .. 11. *H. lacunosa*.  
 Leaves moderate-sized, under 4 in. long; elliptic or obovate; main nerves indistinct, at about 60° with the midrib; climber .. 12. *H. diversifolia*.  
 Leaves large, over 7 in. long, oblanceolate; main nerves prominent, as are reticulations; trailer, epiphytic .. 13. *H. Maingayi*.  
 Corona with lower lobes of processes acute or nearly so:—  
 Leaves with nerves easily visible when dry:—  
 Leaves with 5 basal nerves, the lowest pair faint .. 14. *H. parasitica*.  
 Leaves pinnately nerved:—  
 Flowers moderately large, ·5 in. in diam. in bud; leaves with not very conspicuous reticulations; follicles with very thick pericarp .. 15. *H. coriacea*.  
 Flowers small, ·25 in. in diam. in bud:—  
 Leaves large, usually over 5 in. in length and 1·5 in. in breadth; main nerves very prominent:—  
 Main nerves at 40° with the midrib; reticulations prominent, chiefly on upper surface, but not sharp .. 16. *H. Forbestii*.  
 Main nerves at 60° with the midrib; reticulations very prominent and sharp on both sides; follicles with thin pericarp .. 17. *H. Finlaysonii*.  
 Leaves moderate-sized, usually under 5 in. in length and 1·75 in. in breadth; main nerves nearly at right angles to midrib, rather faint on both surfaces .. 18. *H. Ridleyi*.  
 Leaves with nerves not or very faintly visible when dry:—

Flowers minute; corolla rarely over .15 in. in diameter;  
pedicels filiform:—

Leaves lanceolate, margins only slightly recurved .. 19. *H. parviflora*.

Leaves ovate or ovate-lanceolate, margins very strongly  
recurved .. .. 20. *H. revoluta*.

Flowers moderate-sized; corolla .4 in. broad; pedicels  
thick, broadly flattened when dry; leaf-margins slightly  
recurved .. .. 21. *H. plicata*.

Corolla rotate-campanulate; lobes very short, broader than long;  
corona-processes with lower lobes spreading, upper erect  
(Sect. V. CYSTIDIANTHUS):—

Flowers rather large; corolla over 1 in. broad; leaves rather  
large, with conspicuous nerves; shrubby, apparently not root-  
ing along the stems .. .. 22. *H. campanulata*.

Flowers small; corolla .3 in. broad; leaves small, with nerves  
not or scarcely visible; slender, rooting all along the stems . 23. *H. Wrayi*.

1. HOYA MULTIFLORA, Blume Cat. Hort. Buit. 49 (1823), and Bijdr. 1064. An epiphytic undershrub, rooting from the branches on the bark of trees; branches stout, smooth, pale, glabrous. *Leaves* coriaceous, membranous when dry; oblong or oblong-lanceolate, acuminate at apex, acute at base; both surfaces glabrous, more or less shining; margins reflexed; 3 to 8 in. long, 1 to 2 in. broad; midrib stout, raised beneath when dry; main nerves 7 to 10 pairs, the lowest pair faint, close to the margin, the rest curving upwards to and along the margin where they join in loops; secondary nerves few or none; reticulations transverse, irregular, netted, more obvious on the upper surface; petiole stout, .5 to .75 in. long. *Umbels* racemose, many-flowered (40 to 50), on a stout tubercular bracteate nearly globose rachis at the end of an interpetiolar peduncle; peduncle stout, 1 to 2 in. long; pedicels slender, 1.5 to 2 in. long; flowers white tipped with yellow or yellow tipped with brown, with waxy-white corona. *Calyx* membranous, cleft about two-thirds down; lobes oblong, .075 in. long; scales rounded, flattened. *Corolla* rotate, completely reflexed when open; tube minutely bearded at base, .2 in. long; lobes triangular, .25 in. long, with small folds in the sinuses. *Corona* of 5 horny glabrous processes, with erect upper lobes, conical, longer than the anthers and a horizontal or upcurved horn-like lower lobe at the base, each about .15 to .2 in. long. *Staminal-column* .3 in. long, stipitate; anthers erect or slightly inflexed; appendages very small, inflexed; pollen-masses oblong, .05 in. long, with a narrow thin outer margin, attached by short cup-like caudicles to the narrow usually clavate pollen-carriers. *Style-apex* conical-apiculate at tip. *Follicle* 1, slender, pendulous, 7 to 8 in. long, .3 in. broad; pericarp thin, smooth. *Seeds* small, oblong, .25 in. long, narrowly winged above on both sides, broadly truncate, with a 2 in. long white silky coma; testa very thin, brown;

cotyledons oblong, 0·75 in. long; radicle cylindric, ·05 in. long. Hook. f. Fl. Br. Ind. IV. 52. *H. coriacea*, Lindl. Bot. Reg. 1839, t. 18, *not of Blume*. *Cyrtoceras multiflorum*, Benn. in Herb. Horsf.; Miq. Fl. Ind. Bat. II. 514. *Cyrtoceras reflexum*, Benn. in Horsf. Pl. Jav. Rar. 90, t. 21; Ridley in Trans. Linn. Soc. Ser. 2, III. 321. *C. floribundum*, Maund Botanist, IV. t. 178. *Centrostemma multiflorum*, Dene. in Ann. Sc. Nat. Ser. 2, IX. 272, and in DC. Prodr. VIII. 634; Blume Mus. Bot. Lugd.-Bat. I. 45; Hassk. Flor. Bot. Zeit. IX. (1845) 250; Bot. Mag. t. 5173. *C. Lindleyanum*, Dene. in DC. l. c.

PENANG: (drawing in Herb. Kew); at Gunong Pulai, 1800 ft., *G. King*. PERAK: at Tea Gardens, *Curtis*; at Gunong Kelidang, *Ridley* 9739; at Birjay Malacca, and Gunong Haram Paroh, *Scortechini* 635, 1905; on tree branches in forest, 1000 to 3000 ft., *King's Collector (Kunstler)* 2423, 7297. MALACCA: on Mount Ophir, *Maingay* (K.D.) 1123.—DISTRIB. Burma (Boronga Island, Arracan, *Kurz*), Java, Borneo, Philippine Islands.

2. HOYA LASIANTHA, Korthals in Miq. Fl. Ind. Bat. II. 526 (1856). A climbing and perhaps epiphytic undershrub; branchlets rather stout, smooth, yellowish when dry. *Leaves* thinly fleshy when fresh, chartaceous when dry; elliptic or lanceolate, cuspidate-acuminate at apex, acute or rounded at base; both surfaces glabrous, upper shining; margins slightly recurved; 4 to 6 in. long, 1 to 2·5 in. broad; midrib slender, impressed above, raised beneath, with a small pit or gland just above the petiole; main nerves prominent, impressed above, 8 to 10 pairs, at an angle of 50° to 60° with the midrib, curving upwards to and along the margin, the upper ones forming a looped intramarginal nerve; reticulations netted, most prominent on the upper surface; petiole stout, ·5 to ·75 in. long. *Umbels* 8- to 12-flowered, on short tubercular rachises at the ends of stout axillary or lateral peduncles 1 to 3 in. long; pedicels slender, 1·5 to 2 in. long, glabrous; flowers orange-yellow with white soft hairs, the corona ochreous-yellow, shining. *Calyx* membranous, hyaline with dark nerves; lobes ovate to nearly orbicular; scales subulate. *Corolla* about ·8 in. broad when spread open; tube very short; lobes lanceolate-acuminate, densely white-villous at their base, recurved in flower. *Corona* of 5 shining processes, horny when dry, adnate to the lower part of the anthers; the lower lobe ovoid, somewhat laterally flattened, inflated, cleft beneath into two wings; the upper also erect, tongue-like, rounded. *Staminal-column* moderately long; anthers closely appressed to the upper lobe of the corona, cells slightly divergent; appendages scarious, broad, obtuse; pollen-masses rather long, waxy, flattened, oblong, attached by short, rather thick, cup-like caudicles to the conical pollen-carriers. *Style-apex* 5-angled, tip conical, acumi-

nate. *Follicle* 1, slender, 7 in. long, about .25 in. broad, nearly horizontal; pericarp thin, striate. *Seeds* .2 in. long, elliptic with a short neck, truncate at tip, bearing a white silky coma 1.5 in. long; cotyledons fleshy, elliptic, .1 in. long; radicle cylindric, .05 in. long. N. E. Brown in Gard. Chron. XVIII. 333 (1882), fig. 57. *Plocostemma lasianthum*, Blume in Rumph. IV. 30, and Mus. Bot. Lugd.-Bat. I. 60, t. XIV.; Bot. Mag. t. 5081.

PERAK: *Scortechini* 605. SELANGOR: at Semenyeh, *Goodenough* for *Ridley* 8194.—DISTRIB. Java, Borneo (*Korthals*).

The cultivated specimen imported from Borneo, represented in Bot. Mag. t. 5081, and that collected by Curtis at Wyncoop's Bay, Java, and figured by N. E. Brown in the 'Gardeners' Chronicle,' appear to differ somewhat from the Malay Peninsula specimens in having larger leaves cordate at the base and rather larger flowers. But we fail to find any difference in the structure of the flowers. Another Java specimen (*Curtis* No. 61) which was sent to Messrs. Veitch & Co., agrees well with the Peninsular plants.

3. *HOYA CURTISII*, King & Gamble, n. sp. A twining small epiphytic undershrub, rooting at almost all the nodes on the bark of trees or on rocks; branchlets slender, pubescent. *Leaves* sessile, very thick; orbicular, abruptly triangular-acuminate at apex, rounded or sometimes very slightly attenuate at base; both surfaces scabrous-punctulate when dry; margin thickened; .4 to .7 in. long, .4 to .6 in. broad; midrib when dry faint, other nerves invisible; petiole none. *Umbels* sessile, terminal or axillary, 10- to 16-flowered, on a .25 in. long tubercular rachis; pedicels slender, pubescent, .75 to 1 in. long; flowers rather large. *Calyx* with very short tube or almost none; lobes oblong, ciliate, villous without, membranous, .1 in. long, much recurved; scales minute. *Corolla* also much recurved; tube very short, with an annular spreading ring (or corolline corona?) a little above the base; lobes spatulate, acute at the tip, minutely scurfy-puberulous, .25 in. long. *Corona*: corolline (see above), annular; staminal, of 5 cucullate processes nearly globose when closed, but formed of 3 lobes, the two side ones rounded, the upper ovate, the three enclosing a cavity, and the whole corona much overtopping the staminal-column. *Staminal-column* short and shortly stipitate, attached at the base of the corolla-tube; anther-cells much divergent; appendages ovate, membranous, dentate; pollen-masses oblong-obtuse, about .03 in. long, attached by oblong fleshy thick caudicles to the conical pollen-carriers. *Style-apex* shortly 5-angled, somewhat depressed; tip bifid, very short. *Fruit* not known.

PERAK: at Waterloo, 2000 ft., *Curtis* 2894.

4. *HOYA OBTUSIFOLIA*, Wight Contrib. 38 (1834). A climbing (epiphytic?) shrub, with stout fleshy branches reaching .5 in. in diameter

and smooth puberulous bark. *Leaves* very thick, fleshy; oblong, rounded or emarginate and usually apiculate at apex, rounded or cordate at base; both surfaces shining, glabrous except on the midrib; margins recurved; 4 to 6 in. long, 2 to 3 in. broad; midrib very thick, channelled and pubescent above, raised and glabrous or puberulous beneath; nerves visible only when dry and then main nerves seen to be nearly horizontal, about 10 to 12 pairs, soon branching; petiole very thick, .5 to 1 in. long, puberulous. *Umbels* many-flowered, racemose, on thick tubercular rachises .5 to .75 in. long and up to about .4 in. in diam., at the ends of thick 1 to 3 in. long puberulous peduncles which are apparently lateral; pedicels rather thick, 1 to 1.5 in. long, puberulous, slightly enlarged below the calyx and dotted; buds 5-angled, acute at tip, .4 in. long; flowers dull yellow. *Calyx* fleshy; lobes linear-oblong, obtuse, recurved, .15 in. long, dotted and pubescent without. *Corolla* nearly 1 in. in diam. when open, pubescent without, glabrous within; lobes ovate-cordate-acuminate, generally erect, .4 in. long. *Corona* of 5 processes; the lower lobe suberect, obtuse, inflated, concave above and channelled beneath; the upper erect, longer than the anthers, acuminate. *Staminal-column* short; anther-cells parallel with small divergent wings below; appendages membranous, erect, acute; pollen-masses oblong, rounded, thin on the outer margin, attached by rather long curved caudicles to the rather large conical pollen-carriers. *Style-apex* obscurely 5-angled, obconical, long-apiculate. *Fruit* not known. Wall. Cat. 8167; Dene. in DC. Prodr. VIII. 638; Hook. f. Fl. Br. Ind. IV. 58. *H. Teysmanniana*, Miq. Fl. Ind. Bat. II. 522.

PENANG: ? Wallich 8167. PERAK: *Scortechini*. PAHANG: *Ridley* 2732. SINGAPORE: at Serangoon, on mangrove trees, *Ridley* 8932.—  
DISTRIB. Tenasserim or Andaman Islands (*Helper* 3790), Sumatra (*Teysmann* 1170), Java.

The colour of the flowers seems to be a little in doubt. *Teysmann* gives it as "white," the Fl. Br. Ind. says "dull yellow," *Ridley* says "white with a red centre." It would seem therefore probable that the corolla is white turning yellow and the corona red.

5. *HOYA IMPERIALIS*, Lindl. in Bot. Reg. (1846) under t. 68, *in note*, and in Journ. Hort. Soc. V. 80 *with woodcut* (1850). A stout climbing shrub, rooting on trees and probably epiphytic; branches rounded, dark green, puberulous, puncticulate and with papery bark when dry, reaching .5 in. in diam. *Leaves* fleshy or coriaceous, membranous when dry; elliptic or elliptic-oblong, obtuse or shortly acuminate or apiculate at apex, rounded at base or slightly cordate; both surfaces shining when dry,

glabrous above, puberulous or glabrate beneath; margins slightly recurved; 6 to 9 in. long, 1·5 to 2·5 in. broad; midrib stout and broad, pubescent on both sides; main nerves many, more than 12, but difficult to enumerate, nearly horizontal, at first straight, then branching and anastomosing; petiole ·25 to ·5 in. long, stout, pubescent. *Umbels* many-flowered (about 10), on short, often strongly tubercular and cushioned; rachises at the ends of stout pubescent axillary peduncles 3 to 10 in. long; pedicels stout, pubescent, 2 to 3 in. long; buds large, rounded above, produced below in 5 short recurved angles; flowers with corolla dark purplish-brown above, cinnamomeous beneath, the corona white or pale yellow. *Calyx* membranous, puberulous without, scurfy within; lobes ovate-ciliate, ·2 in. long; scales minute, triangular. *Corolla* leathery, 2 to 3 in. in diam.; the puberulous tube a little shorter than the ovate-triangular acute lobes, which are at first much incurved, afterwards spreading. *Corona* of 5 laterally compressed processes; the lower lobes erect, obtuse, deeply 2-cleft and pubescent in the clefts; the upper lobes also erect-subulate-acuminate. *Staminal-column* short, broad; anther-cells broad; appendages membranous, broadly winged, acuminate; pollen-masses flattened, oblong, truncate at both ends, ·075 in. long, attached by short slender caudicles to the thick, trigonous, horny, brown pollen-carriers. *Style-apex* pentagonal, the angles rounded below, ridged above, the ridges joining in an acuminate cone. *Follicle* 1, lanceolate-acuminate, 8 to 9 in. long, 1 in. broad; pericarp leathery, opening flat, at first puberulous, afterwards glabrous, striate when dry. *Seeds* obovate, flask-shaped, ·2 in. long, trigonous above, truncate at tip and bearing a silky white coma 2 in. long; testa corky, pale brown; albumen copious; cotyledons thick, ovate, cordate at base, ·1 in. long; radicle ·075 in. long, thick. Hook. Bot. Mag. t. 3397, copied in Fl. des Serres IV. tt. 393, 394; Ann. de Gand (1848) t. 228; Jour. Hort. Ser. 3, XXV. 485; Miq. Fl. Ind. Bat. II. 527; Hook. f. Fl. Br. Ind. IV. 59. *H. splendens*, Maingay MS. *Asclepias Sassuela*, Roxb. Fl. Ind. II. 31 (excl. syn.) ?

MALACCA: *Maingay* (K.D.) 1135.—DISTRIB. Borneo (*Beccari* 4001, *Motley* 1041).

6. HOYA ELLIPTICA, Hook. f. in Fl. Br. Ind. IV. 58 (1883). A slender twining undershrub; branchlets pale, terete, glabrous. *Leaves* fleshy (?) when fresh, chartaceous when dry; elliptic, obtuse both at apex and base; glabrous on both surfaces and pale, especially beneath; margin hardened, nerve-like, slightly recurved; 1·5 to 2·5 in. long, 1 to 1·5 in. broad; nerves prominent when dry; midrib slender; main nerves nearly at right angles to the midrib, irregular, 8 to 10 pairs, straight to join a prominent intramarginal looped nerve at ·1 to ·15 in. from the

edge, the said intramarginal nerve connected by many cross-nerves with the hardened marginal nerve; reticulations netted; petiole .15 to .25 in. long, flattened. *Umbels* racemose, about 8- to 10-flowered, on a short tubercular rachis at the end of a thickened pink peduncle reaching 1 in. in length; pedicels slender, 1 to 1.5 in. long, puberulous; buds .25 in. long, 5-angled, the incurved valvate corolla-lobes forming a central concavity; flowers "white" (Maingay), nearly black when dry. *Calyx* puberulous, pale pink; tube very short; lobes ovate-oblong, obtuse, .05 in. long; scales minute. *Corolla* .5 in. broad when open, glabrous without, sparingly pilose within; lobes obcordate, apiculate, inflexed (when dry). *Corona* of 5 processes; the lower and large lobes suberect, laterally compressed, bladder-like (the interior of the cavity delicately hairy), ovate, slightly apiculate; the upper short, flattened, slightly recurved, appressed to and covering the anther. *Staminal-column* attached to the base of the corolla-tube; anthers short, much inflexed so as to lie nearly horizontal; cells parallel above, divergent and empty below; appendages scarious, acute; pollen-masses oblong-falcate, pellucid on the outer margin, nearly horizontal, attached by thickened caudicles to the rather large elongate pollen-carriers which are obtuse above and 2-winged below. *Style-apex* 5-angled, flattened, with a short central umbo having 5 divergent rays to the angles. *Fruit* not known.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1137.

7. HOYA CORONARIA, Blume Bijl. 1063 (1825), and Rumph. IV. 31, t. 182, fig. 2 and t. 184 (fruit). A stout twining shrub, the upper branches giving out roots on to the bark of trees and probably therefore more or less epiphytic; branches thick, velvety pubescent, the innovations especially so. *Leaves* thickly coriaceous; elliptic elliptic-ovate or ovate-oblong, shortly acuminate at apex, rounded at base; upper surface when dry shining, wrinkled, puberulous especially on the midrib; lower surface pale brown, velvety-pubescent; margins strongly recurved; 3 to 4 in. long, 1 to 2 in. broad; midrib stout, impressed above, raised beneath; main nerves very obscure, about 5 to 7 pairs, nearly horizontal; reticulations not visible; petiole thick, velvety, .25 to .75 in. long. *Umbels* racemose, rather few-flowered, on thick rachises with large rounded tubercles .5 to 1.5 in. long, at the ends of thick lateral velvety peduncles .5 to .75 in. long; pedicels velvety, curved, thick, .5 to 1 in. long; buds depressed at top, the lobes decurved in a hook; flowers large, fleshy, about 1.5 in. in diam., greenish-white changing to ivory-white, then apparently to pink which darkens and becomes speckled with purple (Ridley); the corona white. *Calyx* thick, velvety without; lobes orbicular, .15 to .25 in. long; scales subulate. *Corolla* very thick, glabrous within, villous without; lobes triangular-



acuminate, cordate at base, .4 in. long. *Corona* of 5 spreading processes, horny when dry; the lower lobe nearly hemispherical, concave above, convex beneath, about .25 in. long; the upper acuminate, curved far over the anthers. *Staminal-column* short, thick, inserted at the base of the corolla-tube; anthers incurved, their cells parallel above, divaricate and empty below; appendages prominent, scarious, ovate-acute; pollen-masses broadly clavate, attached by means of long slender twisted caudicles to the rather large pollen-carriers which are rounded above and bifid below. *Style-apex* circular, saucer-shaped, with a small central umbo and 5 slender rays. *Follicle* 1, 6 to 10 in. long, 1.5 to .2 in. in diam., gibbous at base, subcylindric above, ending in an obtuse point; pericarp very thick, puberulous, striate; the endocarp woody and smooth; the follicle at length opening nearly flat. *Seeds* obovate, .4 in. long, truncate at tip and bearing a copious white silky coma 2 to 2.5 in. long; cotyledons elliptic, .2 in. long, fleshy; radicle cylindric, .1 in. long. *Miq. Fl. Ind. Bat.* II. 517; *Hook. f. Fl. Br. Ind.* IV. 58; *Ridley in Trans. Linn. Soc. 2nd Ser.* III. 321. *H. grandiflora*, Bl. MSS.; *Dene. in DC. Prodr.* VIII. 635. *H. velutina*, *Wight Contrib.* 35; *Wall. Cat.* 8150; *Dene. l. c.*

PENANG: ? *Wallich* 8150 (marked "Sillet," but probably in error); *Curtis* 236. DINDINGS: *Curtis*; *Scortechini* 1053. PERAK: at Goping, *Scortechini* 2009; at Matang, on sea coast, *Wray* 2710; at Larut, *Kunstler* 3865 (leaves only); *King's Collector* 4116, 6954. MALACCA: *Griffith* 3788; *Maingay* (K.D.) 1125. PAHANG: at Kwala Pahang, *Ridley*. SINGAPORE: at Serangoon, *Ridley* 2731A.—DISTRIB. Java, Sumatra (*Teysmann* 1171), Borneo (*Motley* 871, *Burbidge*), Celebes, New Guinea (*H. O. Forbes* 516, flowers 2 in. in diam.).

We have not quoted *Hook. Bot. Mag.* 4969, which in some respects seems to represent more nearly *H. obtusifolia* rather than this. As in other species, the colour of the flower is either very variable or in doubt. *Low's* drawing in *Herb. Kew* shows pink flowers, while *Scortechini* says they are white, *Kunstler* and *Wray* that they are "very pale yellow," and *Maingay* that they are "white or yellowish with purple spots."

8. HOYA SCORTECHINII, King & Gamble, n. sp. An epiphytic under-shrub, rooting at intervals on the bark of trees; branchlets slender, terete, pale brown. *Leaves* thick, fleshy, drying coriaceous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate at base; both surfaces glabrous, lower minutely glandular; margins recurved; 2 to 3.5 in. long, .75 to 1.25 in. broad; nerves only visible when dry; midrib thick; main nerves 5 to 6 pairs at an angle of 50° to 60° with the midrib, branching early and anastomosing near the margin; reticulations transverse; petiole stout, .2 in. long. *Umbels* apparently few-flowered,

on stout (.25 in.) rachises with small tubercles at the ends of rather long (1.5 to 4 in.) slender peduncles; pedicels slender, .5 to .75 in. long; buds hemispheric, 5-angled, flattened above, .25 in. in diam. *Calyx* small; lobes ovate, ciliate, membranous, glandular, recurved, .03 in. long. *Corolla* .5 to .6 in. in diam. when open, glabrous without, puberulous within; lobes ovate-acuminate, .2 in. long. *Corona* of 5 processes more or less upturned; lower lobes ovate, thick, very obtuse at tip, with a raised ovate ring above and deeply cleft valves below; upper lobe shorter than the anthers, erect, acute. *Staminal-column* short; anther-cells slightly divergent; appendages scarious, acuminate; pollen-masses thick, oblong, straight on inner side, attached by short caudicles embracing their base to the rather large conical pollen-carrier. *Style-apex* 5-lobed, acute at tip. *Follicles* (immature) 1 or 2, very slender, narrow; pericarp very thin, smooth. *Seeds* small, oblong, truncate at tip with a .75 in. long coma.

PENANG: *John Scott*. PERAK: *Scortechini* 464, 1557.

John Scott's specimen has rather thinner leaves, but this is probably only due to youth. His specimen bears no flowers, only young fruit, so we think it best not to couple his name with the species.

9. *HOYA CAUDATA*, Hook. f. *Fl. Br. Ind.* IV. 60 (1883). A twining epiphytic shrub, rooting on trees; branches .1 to .2 in. thick, with corky rugose bark. *Leaves* thick, fleshy, coriaceous when dry; ovate, acuminate at apex, rounded or cordate at base; both surfaces glabrous, sparsely papillose; margins corrugate and recurved; 3 to 7 in. long, 2 to 3 in. broad; midrib slender; main nerves 3 to 4 pairs, distant, arching, very faint; reticulations not visible; petiole up to .25 in. long, very thick, so thick as to appear globose. *Umbels* many-flowered on a .5 to 1 in. long tuberculate rachis at the end of a thickened 1 in. long peduncle; pedicels .5 in. long, filiform; flowers white suffused with pink. *Calyx* very membranous; lobes linear-lanceolate, glabrous, .05 to .075 in. long. *Corolla* .5 to .75 in. in diam.; lobes ovate, long caudate-acuminate, silvery-pilose within. *Corona* fleshy; lower lobes horizontal, elliptic-ovate, the broadest end outwards, concave above; the upper lobe produced in a long erect subulate spur shorter than the anther-tips. *Staminal-column* short; anther-wings straight; appendages membranous, long caudate-acuminate; pollen-masses flattened, oblong, truncate, attached by cup-shaped broad caudicles to the rather narrowly ovate brown pollen-carrier. *Style-apex* 5-angled, with a short conical tip.

MALACCA: *Maingay* (K.D.) 1128.

10. *HOYA LATIFOLIA*, G. Don *Gen. Hist. Dichl. Pl.* IV. 127 (1838).

A climbing (probably epiphytic) shrub; branches very stout, smooth, lenticellate, giving out slender rootlets occasionally. *Leaves* very thick, fleshy; ovate or oblong-ovate, acute at apex, rounded or cordate at base often slightly peltate; glabrous on both surfaces, dull when dry; margins strongly recurved, shining; 5 to 10 in. long, 3 to 7 in. broad; midrib with a gland at the base; nerves 3 to 5 from the base, connected at intervals by few irregular cross-nerves; reticulations not otherwise visible; petiole very stout, .25 to .5 in. long, articulated to a thick shining cup-like base at the node. *Umbels* racemose, on thick, pitted, up to 1 in. long, tubercular rachises at the end of stout 1 to 2 in. long peduncles, which are solitary or fascicled in the leaf-axils or at the nodes of very long (sometimes 5 ft.!) flowering branches; pedicels very slender, puberulous, .25 in. long; buds flattened, 5-angular; flowers very small, grey, .35 in. broad when open, .15 with the lobes closed. *Calyx* minute, membranous; lobes ovate, acute, .3 in. long. *Corolla* small, rotate, pubescent within; lobes ovate, at first incurved over the staminal-column, afterwards spreading. *Corona* of 5 membranous processes, each consisting of an ovate lower horizontal or slightly upcurved lobe concave above and deeply grooved below, the tip apiculate recurved, and an upper shorter erect lobe with acute tip and a channel behind. *Staminal-column* very short; anther-cells divergent; appendages membranous, acute; pollen-masses oblong-falcate, pellucid on the outer margin, attached by short thick caudicles to the rather large 3-lobed pollen-carriers. *Style-apex* sharply 5-angled, conical-apiculate. *Follicle* 1, very slender, 4 to 4.5 in. long, .2 in. broad; pericarp thin, puberulous. *Seeds* oblong, acute at base, truncate at tip, .25 in. long, bearing a white silky coma 1 to 1.25 in. long; cotyledons thick, ovate-oblong, .1 in. long; radicle as long and broad as cotyledons, flattened. Dene. in DC. Prodr. VIII. 638; Miq. Fl. Ind. Bat. II. 521; Hook. f. Fl. Br. Ind. IV. 57. *H. macrophylla*, Wight Contrib. 38, *not of Blume*. *H. polystachya*, Blume Mus. Bot. Lugd-Bat. I. 45, t. 9; Miq. l. c. 522.

PENANG: Wallich 8165A. PAHANG: Kota Glarggi woods, Ridley in Trans. Linn. Soc. Ser. 2, III. 321. SINGAPORE: Maingay (K.D.) 1124; Lobb; Hullett 621; at Cluney Road, Goodenough 2734—DISTRIB. Java, Sumatra.

11. HOYA LACUNOSA, Blume Bijdr. 1063 (1825). A creeping epiphytic undershrub, rooting at the nodes; branchlets very slender, glabrous. *Leaves* very thick, fleshy; ovate, ovate-lanceolate or lanceolate, acute or acuminate at apex, rounded or attenuate at base; both surfaces glabrous, shining; margins thickened; .75 to 1.75 in. long, .5 to .75 in. broad; midrib when dry faint, usually glandular at the base; main nerves 2 to

4 pairs, also faint but visible, at right angles to the midrib, straight to join an intramarginal nerve covered by the marginal thickening; petiole thick, very short. *Umbels* axillary, on stout peduncles .75 to 1.5 in. long, which end in a thickened rachis of cushion-like bracts often .25 in. long; pedicels slender, .25 to .35 in. long; buds globose; flowers white, usually tinged with yellow, scented. *Calyx* rotate, membranous; lobes as long as tube, .025 in. long, obtuse; scales minute. *Corolla* .25 in. in diam. when spread out, pubescent or scurfy within; lobes triangular, recurved. *Corona* membranous, of 5 processes, forming a concave-sided cone, the lower lobe of each process spreading or upcurved, ovate, the upper lobe ovate-acute, exceeding the anther. *Staminal-column* short; anthers minute with very thin membranous acute appendages; pollen-masses oblong-falcate, reticulate, compressed, attached by erect thickened cup-shaped caudicles to the small pollen-carriers. *Style-apex* rather deeply lobed; tip conical. *Follicles* smooth. Dene. in DC. Prodr. VIII. 638; Hassk. Cat. Bogor. 126, and Flora Bot. Zeit. (1845) 280; Miq. Fl. Ind. Bat. II. 525; Hook. Bot. Mag. 4826, 5272; Hook. f. Fl. Br. Ind. IV. 55. *Otostenma lacunosum*, Blume Rumph. IV. 30, t. 184, fig. 2 and Mus. Bot. Lugd.-Bat. I. 59, t. 11.

PENANG: *Michado* for *Curtis*. PERAK: *Scortechini* 1558; *King's Collector* 3476. MALACCA: *Maingay* (K.D.) 1133 (*part*). SELANGOR: at Rawang, *Ridley* 7569.—DISTRIB. Sumatra, Java, Borneo.

12. HOYA DIVERSIFOLIA, Blume Bijdr. 1064 (1826). A climbing glabrous shrub; branches flexuous, smooth, brown; branchlets paler; the bark very thin. *Leaves* fleshy, very thick; broadly elliptic or obovate, obtuse or apiculate at apex, rounded at base; both surfaces glabrous, dull; margins recurved; 2 to 4 in. long, 1.5 to 2.5 in. broad; nerves only visible when dry, midrib broad; main nerves about 4 to 6 pairs, rather irregular, at about 60° with the midrib, soon branching; reticulations very indistinct; petiole .25 to .5 in. long, thick. *Umbels* many-flowered, on stout thick .25 to .75 in. long tubercular rachises at the ends of very thick .5 to 2.5 in. long peduncles, which are lateral one to each pair of leaves; pedicels slender, .5 in. long; buds flattened with 5 rounded angles; flowers .25 to .35 in. broad, white or rose-coloured with pink corona (yellowish-white (*Maingay*)). *Calyx* membranous; lobes elliptic-obtuse, usually ciliate at the tips, .075 in. long; scales apparently none. *Corolla* glabrous without, puberulous within; lobes cordate-acuminate. *Corona* of 5 processes attached to the bases both of the staminal-column and of the corolla-tube; lower lobe of each process orbicular or ovate, concave above and with a small central boss, 2-winged below, the wings connivent; upper lobe erect, triangular-acute, shorter than the anther-appendages. *Staminal-column* very short;

anther-cells parallel above, divergent and empty below; appendages scarious, acute or acuminate; pollen-masses oblong, truncate at top, thin on the outer margin, attached by very short thick caudicles to the rather long obconical pollen-carriers. *Style-apex* 5-angled, depressed, with a short conical apiculus. *Follicles* sublinear, falcate, 6 in. long, .75 in. broad; pericarp thick, apparently .25 in. or more. *Seeds* oblong, .25 in. long. Dene. in DC. Prodr. VIII. 636; Miq. Fl. Ind. Bat. II. 518; Hook. f. Fl. Br. Ind. IV. 61. *H. orbiculata*, Wall. in Wight Contrib. 36; Wall. Cat. 8151; Dene. l. c. 635; Miq. l. c. 519. "*Sussuela esculenta*," Rumph. Herb. Amb. V. 467, t. 175, f. z.

PENANG: at Pulau Boetong, *Curtis* 928. PERAK: *Wray* 2718; *Scortechini* 118. MALACCA: *Griffith* 3787; *Maingay* (K.D.) 1130. PAHANG: at Pekan, *Ridley* 1619. SINGAPORE: *Ridley* 1626, 2733—DISTRIB. Burma (at Prome, *Wallich* 8151), Java, Amboyna.

13. HOYA MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 62 (1883). A trailing epiphytic shrub, sending out rootlets along its stem; nodes much swollen; branches stout; branchlets terete, pale brown. *Leaves* very thick, fleshy, coriaceous when dry; elliptic-lanceolate or oblanceolate, shortly acuminate at apex, long acuminately narrowed at base; both surfaces glabrous, dull when dry; margins recurved; 7 to 9 in. long, 2.5 to 3.5 in. broad; midrib slender but prominent when dry, with a gland or enlargement at the base above the petiole; main nerves about 5 pairs, prominent when dry, especially above, at about 60° to 70° with the midrib, nearly straight at first, then branching and forming a rough intramarginal nerve; secondary nerves few; reticulations irregular, distant; petiole thick, .25 to .5 in. long. *Umbels* many-flowered (20 to 30), on a very short tubercular rachis at the end of a thick peduncle .3 to 1 in. long; pedicels very slender, .5 to 1 in. long; buds obconical, pentagonal, concave above, .25 in. broad; flowers pale pink; corona white. *Calyx* small, pale pink with red tips, red-scarious-punctate without, glabrous within; lobes .03 in. long, obtuse, ciliate; no scales. *Corolla* .5 to .75 in. broad when open; lobes triangular, villous within with pale crisped hairs. *Corona* of 5 processes; outer lobe ovate, acute, horizontal, bi-cleft, concave above with central ridge, 2-valved below; upper of a short acute tooth shorter than the anther-tip. *Staminal-column* short, attached at the base of the corolla-tube; anther-cells divergent; appendages scarious, acuminate, incurved; pollen-masses flattened, oblong-falcate, waxy, attached by short caudicles embracing their bases to the conical pollen-carriers. *Style-apex* 5-angled, angles acute, tip conical. *Fruit* not known in the ripe state, when immature 4 to 5 in. long, .25 in. broad, acuminate, tip recurved; pericarp smooth.

PERAK: *Scortechini* 584. MALACCA: *Maingay* (K.D.) 1136.

14. *HOYA PARASITICA*, Wall. in Wight Contrib. 37 (1834), and Cat. 8159. A stout climbing epiphytic shrub, creeping over the trunks and branches of trees and giving off roots from every part (Roxb.); branches smooth, pale, fleshy. *Leaves* fleshy, thick, very variable; ovate or elliptic or lanceolate, acute or acuminate at apex, rounded or almost cordate to cuneate at base; glabrous on both surfaces; margins recurved; 3 to 7 in. long, 1·5 to 3 in. broad; 5-nerved from the base, the outermost pair thin, forming loops near the margins, from the sinuses of which transverse nerves join them to the middle pair; midrib with several transverse nerves also joining the middle pair, which have one or two loops near the tip, all raised on both surfaces when dry, as are the other irregular reticulations; petiole very thick, ·25 to 1 in. long. *Umbels* many-flowered, racemose, on short or long (reaching 4 in.), thick (often nearly ·25 in. in diam.), tubercular rachises at the ends of stout 1 to 3 in. long axillary or lateral peduncles which are solitary or in pairs; pedicels slender, ·5 in. long or longer; buds turbinate, 5-angled; flowers pearly-white with a pink centre, very fragrant. *Calyx* membranous; lobes ovate, acute; scales very small. *Corolla* ·3 in. broad; lobes cordate, glabrous, inflexed, with the corona-processes projecting between them. *Corona* of 5 membranous 2-lobed processes, which are horny and shining when dry, and white with pink tips; the lower lobes ovate, spreading, grooved beneath; the upper lobes erect, acute. *Staminal-column* short; anther-cells divergent; appendages membranous, acute; pollen-masses oblong, truncate, thin on the outer margin, attached by short thick caudicles to the conical pollen-carriers. *Style-apex* membranous, 5-angled, conical-apiculate. *Fruit* not known. Wight Ic. 587; Dene. in DC. Prodr. VIII. 637; Hook. f. Fl. Br. Ind. IV. 57; Prain Beng. Plants 700. *H. Hookeriana*, Wight Contrib. 37; Wall. Cat. 8153; Dene. l. c. 636. *Hoya* sp., Wall Cat. 8153. *H. pallida*, Lindl. in Bot. Reg. t. 951; Paxt. Fl. Gard. t. 26, copied in Lemaire Jard. Fleur. t. 64. *Asclepias parasitica*, Roxb. Hort. Beng. 20, and Fl. Ind. II. 42; Wight Ic. t. 587.

KEDAH: *Kunstler* 1829. PENANG: at Waterfall, *Curtis*. PERAK: at Sungie Larút, *Wray* 2273; at Bake Kuran, *Scortechini* 1626; at Ulu Bubong, *King's Collector* 10316. MALACCA: *Griffith*; *Maingay* (K.D.) 1126, 1132, 1138. PAHANG: *Praman*, near Pekan, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 321. SINGAPORE: *Ridley* 1796, 8070.—DISTRIB. India (Sikkim, Assam, Sundarbans, Chittagong, Andaman Islands).

*Kunstler* describes the colour of the flowers as "white with a pink centre" or "waxy white with a purplish tinge," but *Wray* says it is "pale greenish-yellow with a few small spots of crimson." *Roxburgh*, who had it in cultivation, says the

flowers are "pearl-coloured," and this is what the Fl. Br. Ind. says of the corolla, giving the corona-processes as "white with pink at the junctures." Maingay (MS. Notes IV. p. 41) says, "petals white, faintly greenish towards the tips, corona white." These remarks, for what seems clearly to be the same plant, explain the difference between Lindley's and Paxton's drawings alluded to in the Fl. Br. Ind. As remarked in Fl. Br. Ind., *H. cinnamomifolia*, Hook. Bot. Mag. 4347, from Java, "has very similar flowers and leaves." But for the corolla being green and the corona purple in that fig., we should be inclined to place it under *H. parasitica*.

15. HOYA CORIACEA, Blume Bijdr. 1063 (1826), and Rumph. IV. t. 187. A climbing shrub, nearly glabrous; branches shining, smooth, angled when dry; branchlets pubescent. *Leaves* coriaceous (Blume) or fleshy (Wight), chartaceous when dry; ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base; glabrous and more or less shining on both surfaces; margins slightly recurved; 3 to 6 in. long, 1 to 2.5 in. broad; midrib slender, raised on the lower surface, sometimes with one or more glands just above the petiole; main nerves distinct, 4 to 6 pairs, at about 40° to 50° with the midrib, straight and then branching and anastomosing with a looped intramarginal nerve; reticulations netted, prominent; petiole slender in young leaves, thick in old ones, .25 to .75 in. long. *Umbels* racemose, many-flowered (30 to 40), on stout tubercular rachises .25 to .75 in. long and .15 to .2 in. thick at the ends of stout lateral puberulous peduncles 2 to 5 in. long; pedicels slender, .75 to 1.25 in. long; buds flattened, 5-angled, .5 in. broad, .15 in. high; flowers straw-coloured, yellow or reddish, the corona white. *Calyx* pubescent without; tube short; lobes linear, sparsely ciliate, .15 in. long; scales minute. *Corolla* .75 in. in diam. when expanded; lobes triangular-ovate, acuminate, villous within and grey when dry ("hairs like collapsed hollow tubes"—Wight), at first incurved over the column, at last recurved. *Corona* of 5 spreading processes, shining and horny when dry; lower lobes ovoid, acute, inflated, 2-winged below with the wings connivent; upper lobes erect, acute, connivent with but shorter than the anthers. *Staminal-column* short; anther-cells parallel above with divergent empty ones below; appendages scarious, ovate-acute; pollen-masses slender, oblong-falcate, straight and thickened on the inner edge, attached by spatulate caudicles with a raised margin above to the very narrow slender pollen-carriers. *Style-apex* 5-angled, rather thick, depressed above with a small umbo. *Follicle* 1, 4.5 to 5 in. long, .5 to .75 in. broad, lanceolate, obtusely beaked; pericarp very thick, woody, rugose. *Seeds* oblanceolate, thick, .25 in. long, truncate at tip and bearing a silky coma 1.25 in. long; cotyledons elliptic, fleshy, .15 in. long; radicle cylindric, .075 in. long. Mus.Bot.Lugd.-Bat. I. 44; Miq. Fl. Ind. Bat. II. 521; Dene. in DC. Prodr. VIII. 638; Bot. Mag. t. 4518, copied in Fl. des

Serres t. 578; Paxt. Fl. Gard. I. 77, fig. 55; Lemaire Jard. Fleur. t 37 Hook. f. Fl. Br. Ind. VI. 61; Schum. in Engl. & Prantl Pflanzenfam. IV. 2, 290, fig. 88 A, B. *H. Brunoniana*, Wight Contrib. 37; Wall. Cat. 8163; Dcne. l. c. 636.

PERAK: *Scortechini* 533. MALACCA: *Griffith*; *Maingay* (K.D.) 1131, 1134. PAHANG: at Pekan, *Ridley* 2171.—DISTRIB. Java, Borneo (*Motley* 1121; *Beccari* 3926).

16. HOYA FORBESII, King & Gamble, n. sp. A climbing shrub, rooting on trees and probably epiphytic; branchlets somewhat angular, lenticellate, with pale brown shining bark. *Leaves* coriaceous when dry; elliptic-oblong or -obovate, shortly and bluntly acuminate at apex, rounded at base; upper surface glabrous, shining; lower surface minutely papillose; both pale brown when dry; margins somewhat recurved; 4 to 7 in. long, 2·5 to 4 in. broad; midrib strong, much raised beneath, bearing on the upper surface a gland just above the petiole; main nerves about 7 pairs, irregular but usually at 40° with the midrib, more or less curved and branching; secondary nerves frequent, especially near the top between the main nerves; reticulations transverse, irregular, clearly visible only on the upper surface; petiole very thick, bent, articulate in the middle, about ·5 in. long. *Umbels* apparently few-flowered, on ·75 in. long rachises with small tubercles at the end of short (about ·75 in.) peduncles; pedicels filiform, ·5 in. long, puberulous; buds flattened, ·25 in. in diam.; flowers having greyish-white corollas with purple tips (*Forbes*). *Calyx* membranous; lobes about twice as long as tube, ovate, ciliate, puberulous without; no scales. *Corolla* ·4 in. in diam., puberulous without; lobes broadly triangular-ovate-acute, incurved. *Corona* of 5 inflated processes closely adnate to the staminal-column; lower lobes horizontal, narrow-oblong, slightly ridged above, 2-valved below, nearly ·1 in. long; upper lobe a minute erect tooth. *Staminal-column* short; anthers incumbent over the style-apex; cells divergent; appendages acute, scarious; pollen-masses flattened, falcate, attached by short straight caudicles to the narrow pollen-carriers. *Style-apex* very thin, deeply 5-lobed with a conical tip. *Fruit* not known.

PERAK: *Scortechini* 1679, 1680.—DISTRIB. Sumatra, on Kaba Volcano, 5000 feet (*Forbes* 2896A).

17. HOYA FINLAYSONII, Wight Contrib. 38 (1834). A climbing shrub; stem stout; branchlets pale brown, smooth, lenticellate, flexuose. *Leaves* coriaceous, thick, hard and tough when dry; ovate- or oblong-lanceolate, obtusely acuminate at apex, more or less rounded at base; both surfaces at first minutely papillose, afterwards glabrescent or dotted, when fresh greenish-red above, dark red beneath; margins with



a wavy nerve close to the edge; 5 to 7 in. long, 1·5 to 2·5 in. broad; nerves very prominent and raised on both surfaces when dry; midrib stout, with a large gland just above the petiole; main nerves about 5 to 7 pairs besides the marginal one, at about 60° with the midrib, nearly straight to join a second and prominent looped intramarginal nerve; secondary nerves many, irregular; reticulations irregular, netted; petiole very thick, ·25 to ·5 in. long. *Umbels* very many-flowered, without any prominent tubercular rachis; peduncles ·75 to 2 in. long, rather slender; pedicels almost capillary, ·5 to ·75 in. long; buds 5-angled, hemispheric below, flattened and depressed above, ·25 in. across; flowers with cream-coloured and pink corolla and waxy-white corona. *Calyx* thin, nearly hyaline, with a few brown veins; lobes obtuse, ·05 in. long, pubescent within. *Corolla* ·4 in. broad when open, pubescent within; lobes triangular-ovate-acute, usually inflexed. *Corona* of 5 spreading inflated processes; the lower lobes ovate-acute, concave at first, afterwards more or less ridged, 2-winged below; the upper lobe erect, short, acute. *Staminal-column* short, attached to the top of the corolla-tube; anther-cells divergent; appendages short, rounded, scarious; pollen-masses oblong-falcate, obtuse at tip, attached by very short thick caudicles to the conical pollen-carriers. *Style-apex* 5-angled, with 5 rays leading to a short apiculus. *Follicle* 1, very slender, 7·5 in. long, ·25 in. broad, straight, acuminate; pericarp thin, glabrous, striate. *Seeds* cylindric, ·3 in. long, acute at base, truncate at tip, and bearing a 1 to 1·5 in. long silky coma; testa very thin, brown; cotyledons fleshy, lanceolate, ·15 in. long; radicle cylindric, ·1 in. long. Wall. Cat. 8166; Dene. in DC. Prodr. VIII. 638; Miq. Fl. Ind. Bat. II. 527; Hook. f. Fl. Br. Ind. IV. 62.

PERAK: Wray 2724; King's Collector 4800. SINGAPORE: Wallich 8166.—DISTRIB. Siam? (*Finlayson*).

The specimens in the Kew Herbarium have no flowers, but we see no reason to doubt the identification of the leaves of our specimen.

18. HOYA RIDLEYI, King & Gamble, n. sp. A twining epiphytic undershrub, rooting at intervals on the bark of trees; branchlets pale, terete, lenticellate, rather slender when dry. *Leaves* fleshy, coriaceous when dry, variable; ovate or ovate-oblong or oblong-lanceolate, acute at apex, rounded or narrowed or sometimes cuneate at base; both surfaces glabrous; margins recurved; 3 to 5 in. long, 1·25 to 1·75 in. broad; midrib slender, faint, as are the nerves generally, even when dry; main nerves about 5 to 6 pairs, the lowest pair starting from the base and curving along the margin, the others nearly at right angles, quickly branching and joining the marginal one; reticulations irregularly

netted; petiole very thick, .25 to .75 in. long, broad at the junction with the blade. *Umbels* many-flowered, on .25 to 1 in. long rachises with small tubercles at the ends of stout lateral peduncles 1 to 4 in. long; pedicels slender, .5 to .75 in. long; buds flattened, .25 in. in diam. *Calyx* papillose without; lobes oblong, acute, .06 in. long; no scales. *Corolla* rugose without, puberulous within; lobes cordate, almost 3-pointed, points acuminate, especially the end one. *Corona* of 5 shining inflated processes; lower lobe horizontal, ovate, sharply acute, concave on the upper surface with a median ridge, 2-valved below; upper lobe on acute erect tooth, shorter than the anthers. *Staminal-column* short, inserted on the tube of the corolla, wings of filaments ear-like; anther-cells divaricate; appendages scarious, acuminate, incurved; pollen-masses flattened, oblong, truncate at top; attached by short thick caudicles to the 3-lobed rounded rather large pollen-carriers. *Style-apex* membranous, 5-angled; tip long conical. *Fruit* not known.

KEDAH: at Pulau Songsong, *Curtis*. PENANG: *Curtis*; at Pulau Tikus, *Ridley* 9476. PERAK: at Maxwell's Hill, *Ridley* 5519. SINGAPORE: at Grange Road, *Ridley* 10358.

To this species, also, probably belongs *Curtis* 2355 from Kwala Lumpor, Selangor, which has, however, smaller leaves, but no flowers.

19. *HOYA PARVIFLORA*, Wight Contrib. 37 (1834). A twining, slender, epiphytic undershrub; rooting on the stems and branches of trees; branchlets very slender, terete. *Leaves* thick, coriaceous; lanceolate, acute both at apex and base; glabrous on both surfaces; margins slightly recurved; 2 to 4 in. long, .35 to .75 in. broad; midrib slender, obscure; main nerves very faint even when dry, 5 to 6 pairs, very acutely (about 10°) spreading from the midrib, the lowest pair even more so; reticulations not visible; petiole about .15 in. long, thick. *Umbels* many-flowered (30 to 40), racemose, lateral or terminal; peduncle rather stout, 1.5 to 1.75 in. long, ending in a thickened strobilate rachis often 1 in. long with minute imbricate bracts; pedicels slender, .25 to .5 in. long; buds globose, depressed; flowers many, about .15 to .25 in. in diam., apparently white. *Calyx* membranous, very small; lobes ovate. *Corolla* rotate, revolute, villous within with unicellular soft hairs; lobes triangular. *Corona* of 5 membranous horizontally spreading processes, forming a shallow cone; lobes longitudinally folded, bifid at apex. *Staminal-column* very short; anthers connivent over the style-apex, with very thin membranous appendages; pollen-masses very minute, flattened, oblong-truncate, attached by minute cup-shaped caudicles to the triangular pollen-carriers. *Style-apex* with a conical tip. *Follicles* very slender, 4 to 5.5 in. long, .2 in. broad; pericarp thin,

smooth. *Seeds* oblong, .25 in. long, not winged, truncate at tip, and bearing a 1 in. long white silky coma; testa very thin, pale brown, smooth; cotyledons oblong, .05 in. long; radicle cylindric, .075 in. long. Wall. Cat. 8156 A; Dene. in DC. Prodr. VIII. 637; Hook. f. Fl. Br. Ind. IV. 54.

PENANG: at Balik Pulau, *Curtis* 689; on Mount Elvira, *Md. Haniff* for *Curtis*.—DISTRIB. Tenasserim (*Wallich* 8156 A).

20. HOYA REVOLUTA, Wight MS.; Hook. f. in Fl. Br. Ind. IV. 55 (1883). A twining epiphytic undershrub, occasionally rooting from the nodes; branchlets slender, terete, glabrous. *Leaves* very thick and fleshy; ovate or ovate-lanceolate, acuminate at apex, rather abruptly acute and attenuate at base; both surfaces glabrous, very pale when dry and more or less shining; margins strongly recurved; 1.5 to 3 in. long, .75 to 1 in. broad; midrib and main nerves (3 to 4 pairs at about 60°) only occasionally, and then very faintly, visible when dry; petiole very thick, .1 to .15 in. long. *Umbels* on a 2 to 4 in. long peduncle, ending in a thick strobilate rachis .5 in. long with cushion-like minute bracts; pedicels of various lengths, .25 to 1 in. long, filiform; buds small, round, depressed, .1 in. in diam.; flowers small, pink, or white with pink tips. *Calyx* rotate; lobes oblong, obtuse, .02 in. long; scales small, flat. *Corolla* .125 in. in diam., with a slight raised fold at the mouth of the tube; lobes triangular, as long as tube. *Corona* of 5 membranous processes united into a conical vertically 5-lobed column, each again lobed and produced upwards in an acute point. *Staminal-column* very shortly stalked; anthers inflexed; appendages acuminate, membranous; pollen-masses oblong, obtuse, attached by short thick caudicles to the small pollen-carriers. *Style-apex* deeply 5-lobed, with a conical apiculus. *Fruit* not known. *H. ovalifolia*, Wall. Cat. 8160B.

PERAK: in Larut 3962 and at Relan Tujor, *Wray* 1902; *Scortechini*. MALACCA: *Griffith*; *Maingay* (K.D.) 1127, 1129, 1123 (*part*). SINGAPORE: *Wallich* 8160B.

*Wray* No. 3962, from Blanda, Mabok Plains, Larut, is a fruiting specimen which may possibly belong to *H. revoluta*, Wight; but the leaves are lanceolate and not ovate, and the flowers are described as yellow instead of pink. The following is the description:—

A climbing undershrub; branches terete, pale brown. *Leaves* fleshy, coriaceous when dry; lanceolate, acuminate at apex, narrowed at base; glabrous on both surfaces; margins strongly recurved; 1.5 to 2 in. long, .5 to .75 in. broad; midrib and main nerves only very faintly visible when dry, the latter curving upwards at an acute angle; petiole very thick, .25 in. long on a much enlarged base. *Flowers* not seen. *Follicle* lanceolate, poniard-shaped, acutely angled, 2.5 in. long, .4 in. broad; pericarp thick. *Seeds* very small, .1 in. long, trigonous-oblong with a broad truncate apex, bearing a white silky coma 1 to 1.5 in. long; testa thin, brown; albumen rather thick;

cotyledons elliptic, .02 in. long; radicle .01 in. long, flattened perpendicularly to the cotyledons.

21. *HOYA PLICATA*, King & Gamble, n. sp. A climbing, probably epiphytic, undershrub; branchlets rather stout, terete, yellowish. *Leaves* fleshy, coriaceous when dry; ovate-lanceolate, acuminate at apex, acute at base; smooth and glabrous on both surfaces; margins slightly recurved; 3 in. long, 1 in. broad; midrib very faint and then only when dry; remaining nerves invisible; petiole stout, .25 in. long, flattened. *Umbels* many-flowered, racemose, on stout tubercular rachises, .25 to .5 in. long at the ends of stout .75 to 1 in. long peduncles; pedicels fleshy, broadly flattened when dry, 1 in. long; buds 5-angled, flattened. *Calyx* small; lobes ovate, acuminate, hyaline; scales subulate. *Corolla* .4 in. broad, with a raised 5-angled villous ridge in the tube above the insertion of the staminal-column, puberulous on both surfaces; lobes triangular, .1 to .15 in. long. *Corona* of 5 shining horny processes attached to the backs of the anthers; lower lobe ovate, obtuse or bifid at apex, with a broad fold on the upper surface; upper lobe erect, acuminate, as long as the anthers. *Staminal-column* short; anther-cells parallel; appendages scarious, acuminate; pollen-masses flattened, granular, thin on the margin, truncate at top, seated on the face of spatulate horizontal caudicles, which connect them with the rather large-lobed pollen-carriers. *Style-apex* 5-angled, fleshy, with a short conical apiculus. *Fruit* not known.

PERAK: at Maxwell's Hill, 3000 ft., *Scortechini* 323.

22. *HOYA CAMPANULATA*, Blume Bijdr. 1064 (1825). A small twining shrub; branches fleshy; branchlets pale brown and shining when dry, the bark scaling off. *Leaves* fleshy and bright-green when fresh, coriaceous when dry; elliptic-oblong, acuminate at apex, cuneate or attenuate, sometimes rounded at base; both surfaces glabrous, more or less shining, pale when dry; margins recurved; 2.5 to 6.5 in. long, 1 to 2.5 in. broad; midrib stout, raised below, impressed above when dry; with a rounded gland at the base above the petiole; main nerves 6 to 7 pairs, straight to meet, often at scarcely more than half-way to the edge, a prominent (when dry) looped intramarginal nerve; secondary nerves few, similar; reticulations many, irregular, prominent, and raised above when dry; petiole .25 in. long, stout. *Umbels* about 16- to 20-flowered; peduncles stout, 1 to 2 in. long, the bracteate portion .25 to .5 in. long; pedicels very slender, 1 to 1.25 in. long; buds globose, depressed; flowers cream-coloured. *Calyx*-lobes membranous, hyaline, subulate. *Corolla* glabrous, about 1 to 1.5 in. broad or broader; lobes ciliate, boat-shaped, .6 in. long; scales very short, apiculate. *Corona* of 5 processes; lower lobes of spreading spurs .15 to .2 in. long,

smooth, shining, horny when dry; upper lobes somewhat similar, erect. *Follicles* straight, cylindric, .6 to .8 in. long, .2 in. broad; pericarp smooth, green with white stripes when fresh. *Seeds* oblong, obspathulate, .3 in. long, .1 in. broad, with a short wing at the base, the tip truncate with a white silky coma 1 to 1.5 in. long; testa very thin, smooth; cotyledons oblong, .15 in. long; radicle cylindric, .1 in. long. Wall. Cat. 8171; Dene. in DC. Prodr. VIII. 633; Miq. Fl. Ind. Bat. II. 513; Hook. f. Fl. Br. Ind. IV. 62. *H. campanulata*, Blume Bijdr. 1064; Lindl. Bot. Reg. (1847) t. 54; Hook. Bot. Mag. t. 4545. *Cystidianthus campanulatus*, Hassk. Cat. Hort. Bog. 126; Blume Mus. Bot. Lugd.-Bat. I. 57; Miq. l. c. 515. *Physostelma Wallichii*, Wight Contrib. 40; Wall. Cat. 8171; Dene. in DC. l. c.; Miq. l. c. 513; Hook. f. Fl. Br. Ind. IV. 62. *P. ? campanulata*, Dene. l. c.

PERAK: at Relan Tujur, Wray 1841, 3139, 4014, 4024; *Scortechini* 171, 336; at Bujong Malacca, *Ridley* 9712; *King's Collector* 2587, 3457, 3819. SINGAPORE: *Wallich* 8171. — *DISTRIB.* Sumatra, Java (*Forbes* 416), Borneo (*Haviland* 1971).

A specimen of *Forbes's* from Sumatra has flowers quite twice as large as those from the Peninsula, but the structure is the same. He says, "Flowers cream-white with a flush of rose-purple, very fragrant." The description of the follicles is taken from those sent by Wray with his No. 1841, but as they are not attached to the plant, and we have seen no others for comparison, we do not feel quite sure of their identification.

23. HOYA WRAYI, King & Gamble, n. sp. A slender creeping epiphytic undershrub, rooting on the branches of trees; stems slender, very rough when dry. *Leaves* fleshy, thinly coriaceous when dry; lanceolate, obtuse and glandular-apiculate at apex, long-attenuate at base; upper surface glabrous smooth, lower minutely papillose, both greyish when dry; margins recurved; 3.5 to 4 in. long, 1 to 1.25 in. broad; midrib slender, broadened at base; main nerves very inconspicuous even when dry, about 4 pairs, at about 30° with the midrib; reticulations not visible; petiole very thick, rugose, jointed at the junction with the blade. *Inflorescence* not seen; rachis minutely tuberculate; pedicels slender, .75 to 1 in. long, scurfy. *Calyx* hyaline, papillose without; tube short; lobes linear-oblong, .05 in. long; scales subulate. *Corolla* campanulate-rotate, .3 in. broad when open, villous within with cellular hairs, margins fimbriate-crispate; lobes very short, triangular. *Corona* of 5 processes, attached above the filament-tube, horny and yellow when dry; lower lobe a slightly upcurved linear-lanceolate ridged spur; upper similar, erect, dorsally flattened, longer

than the anthers. *Staminal-column* with filament-tube free from the corona, otherwise short; anthers short, cells parallel; appendages scarious, ovate, curved over the style-apex; pollen-masses flattened, oblong, obliquely truncate with membranous margins, attached by broadly inflated cup-like caudicles to the conical pollen-carriers. *Style-apex* 5-angled, thick, concave above with a conical apiculus. *Fruit* not seen.

PERAK: at Gunong Batu Pateh, 4300 ft., *Wray* 371.

## 28. DISCHIDIA, Br.

Herbs or undershrubs, usually epiphytic, climbing and rooting on trees or pendulous from them, sometimes almost leafless. *Leaves* usually opposite, fleshy, sometimes converted into pitchers (*ascidia*), sometimes convex and sessile, rugose or bullate. *Flowers* very small, often minute, white yellow or red, in axillary racemose or umbellate cymes or fascicles; the rachis short, thick, tuberculate; peduncles stout. *Calyx* small, 5-partite, membranous, with 5 glandular scales. *Corolla* campanulate tubular or urceolate; the tube ovoid or globose or cylindric; the mouth usually contracted; lobes 5, thick, valvate. *Corolla* staminal, of 5 membranous processes, adnate to the back of the staminal-column, erect, the tips entire, notched or bifid or with incurved or recurved arms; sometimes none or replaced by a corolline corona (Subg. I. CONCHOPHYLLUM). *Staminal-column* very short; filaments connate in a tube; anthers erect, with membranous appendages; pollen-masses 1 in each cell, compressed, waxy, attached by long curved caudicles, usually of cornucopia shape, to the hard oblong pollen-carriers, caudicles in *D. coccinea* very short. *Ovary* of 2 carpels; styles short; style-apex flat or with a conical sometimes capitate tip. *Fruit* of 2 or 1 small slender or thick acuminate follicles; pericarp smooth. *Seeds* very small, flask-shaped, tipped with a long silky coma. —DISTRIB. About 50 species: in tropical India, the Malay Peninsula and Archipelago, the Philippine Islands, New Guinea and Australia.

Staminal-corona absent (Subgenus I. CONCHOPHYLLUM):—

Corolla with a corona like a toothed hanging fold; leaves of two kinds—(1) orbicular, flattened; (2) reniform, markedly convex and bullate, under .75 in. long and 1 in. broad ..

1. *D. astephana*.

Corolla with a corona like a thickened undulate fold; leaves of one kind (so far as known), reniform, slightly convex and bullate, usually over 1 in. long and 1.5 in. broad ..

2. *D. depressa*.

Staminal-corona present, membranous, erect, with incurved or recurved arms (Subgenus II. EUDISCHIDIA):—

Leaves sessile, usually reniform, convex above, closely applied to the tree-trunks or branches (Sect. 1. COLLYRIS) :—

Leaves not bullate; flowers white, tipped with lilac .. 3. *D. Collyris*.

Leaves strongly bullate; flowers scarlet, tipped with lilac .. 4. *D. coccinea*.

Leaves partly or wholly converted into pitchers (ascidia) (Sect. 2. ASCIDIFERA) :—

Ordinary leaves orbiculate, up to 1 in. in diam., pitchers 2 to 5 in. long, oblong, curved, more or less smooth .. 5. *D. Rafflesiana*.

All leaves (so far as known) converted into subreniform compressed rugose pitchers about 2 in. in diam. .. 6. *D. complex*.

Leaves normal, not (so far as known) converted into pitchers or convex and sessile (Sect. 3. NORMALIA) :—

Corona-processes bifid, emarginate or depressed above; lobes incurved :—

Lobes of corona-processes narrow :—

Lobes of corona-processes horizontal or upcurved; leaves thick, fleshy, linear-oblong or spatulate .. 7. *D. benghalensis*.

Lobes of corona-processes curved downwards, spatulate; leaves flat, orbicular, papillose beneath .. 8. *D. Nummularia*.

Lobes of corona-processes broad :—

Leaves ovate, glabrous, not lacunose; corolla-tube merely villous at the throat within .. 9. *D. albida*.

Leaves ovate, often hirsute, lacunose; corolla-tube villous at the throat within and with a ring of hairs half-way down also .. 10. *D. hirsuta*.

Corona-processes rounded or semilunar above; lobes incurved, usually somewhat twisted :—

Corolla-tube under .1 in. long; lobes short, glabrous or villous within :—

Corolla urceolate; tube globose; lobes villous within; leaves lanceolate or ovate-lanceolate, 2.5 to 4 in. long, .75 to 1.25 in. broad; corona-processes extremely thin .. 11. *D. acutifolia*.

Corolla campanulate; lobes glabrous within :—

Leaves ovate, 1.5 to 2.5 in. long, 1 to 1.75 in. broad; petiole flattened .. 12. *D. cordifolia*.

Leaves ovate-lanceolate, 1.5 to 3.5 in. long, .75 to 1 in. broad; petiole not flattened .. 13. *D. monticola*.

Corolla-tube over .1 in. long; lobes elongate, villous within :—

Corolla urceolate, gradually contracted at the throat; tube .125 in. long; leaves ovate-lanceolate, 2 to 2.5 in. long .. 14. *D. Scortechinii*.

Corolla tubular, .3 to .4 in. long, contracted, and again slightly swollen; leaves ovate or ovate-lanceolate, .75 to 1.25 in. long .. 15. *D. tubuliflora*.

#### SPECIES OF WHICH LEAVES ONLY KNOWN.

Leaves elliptic or elliptic-ovate, 1.5 to 3 in. long, .75 to 1 in. broad .. 16. *D. Deschampsii*.

1. *DISCHIDIA ASTEPHANA*, Scortechini MS. in Herb. Calc. A slender creeping epiphytic herb, closely appressed to and rooting on the trunks and branches of trees; stems minutely scabrous-papillose and hirsute. *Leaves* fleshy, sessile, appressed to the stem, dark red beneath, of two kinds—(1) orbicular-villous, papillose, .25 to .35 in. in diam.; midrib slender; main nerves about 2 pairs, very obscure; and (2) reniform, very obtuse, upper surface convex, bullate, lower concave with broad pits, papillose with minute annular papillæ, strigosely hirsute; .5 to .75 in. long, .75 to 1 in. broad; nerves visible on the under surface only, irregular, branching, central one (midrib?) thick. *Umbels* few-flowered, on a thick tubercular rachis .25 in. long at the end of a thick peduncle somewhat shorter; pedicels .1 in. long, angled; buds 5-angled, conical, .15 in. long; flowers white. *Calyx* membranous; lobes oblong-obtuse, ciliate, hirsute beneath, .05 in. long; scales minute. *Corolla* urceolate; tube 5-angled, .125 in. long, contracted at the mouth, furnished within with a ring of stiff hairs below the mouth, and about half-way down a corolline corona consisting of a reflexed membranous hanging annular fold with 5 bilobed teeth, otherwise glabrous; lobes ovate, .025 in. long, erect, pubescent within. *Staminal-corona* none. *Staminal-column* conical, attached to the base of the corolla-tube; filament-ring short; anther-wings horny, large, 2-folded, spreading outwards; anthers erect, cells parallel; appendages very thin, acuminate, connivent; pollen-masses oblong or clavate, truncate, granular, seated on rather long caudicles with cup-like apex, which connect them with the large oblong shining pollen-carriers. *Style-apex* long, conical. *Follicle* 1, lanceolate, 1.25 to 1.75 in. long, acuminate; pericarp very thin, opening out flat and 2-keeled; placenta membranous. *Seeds* not seen.

PERAK: at Bujong Malacca, *Scortechini* 1897. SELANGOR: at Bukit Hitam, *Ridley* 6570 (*in part*).

This very interesting species is closely allied to *Conchophyllum imbricatum*, Bl., the "*Pustula arborum*" of Rumph. Herb. Amb. V. 473, t. 175, fig. 3. Beccari, in *Malesia*, II. 258, maintains Blume's genus *Conchophyllum*, characterized by the absence of a staminal corona. As, however, in all other respects the species seems to us to bear the characters of *Dischidia*, we have preferred to retain it in that genus, as was done by Scortechini, whose manuscript description in the Calcutta Herbarium has been followed closely.

2. *DISCHIDIA DEPRESSA*, C. B. Clarke, MS. in Herb. Kew. A slender creeping epiphyte, closely appressed to and rooting on the stems and branches of trees; stems very slender, wiry; rootlets extremely numerous. *Leaves* fleshy, sessile, orbicular-reniform, flattened or somewhat convex and slightly bullate on the upper surface, glabrous or



very slightly papillose on the lower surface, and with small pits; 1 to 1.25 in. long, 1.5 to 1.75 in. broad; midrib stout; main nerves 2 to 3 pairs, the lowest pair from the base spreading horizontally; the others slightly acutely and early branching. *Inflorescence* not seen. *Calyx* very thin, hyaline; lobes glabrous, rounded, .03 in. long, obscurely 3-nerved. *Corolla* urceolate, much depressed; tube when at full length .075 in. long, glabrous within and furnished in the middle with a 5-lobed undulate fold or corolline corona; the throat closed, with stiff inflexed decumbent shining white hairs; lobes triangular, .05 in. long, thickened, villous within. *Staminal-corona* none. *Staminal-column* short, pyramidal; anther-wings spreading outwards, horny; appendages very thin, obtuse, connivent; pollen-masses cylindro-clavate, attached by cornucopia-shaped caudicles as long as themselves to the ellipsoid pollen-carriers. *Style-apex* conical; tip capitate. *Fruit* not known.

MALACCA: Maingay (K.D.) 1115.

3. DISCHIDIA COLLYRIS, Wall. Cat. 4207 (1829). A creeping epiphyte, trailing over and rooting on the stems and branches of trees; stems slender, terete; rootlets very numerous and spreading. *Leaves* fleshy, coriaceous when dry, sessile; orbicular, convex above with reflexed margins, mucronate or not at apex, slightly cordate at base in young leaves; wrinkled above, papillose and often farinose beneath; 1 to 1.5 in. in diam.; midrib and nerves distinct on the lower surface; midrib stout; main nerves 2 to 3 pairs, nearly at right angles to the midrib, soon branching and spreading; reticulations very few visible. *Umbels* on stout tuberculate rachises in pairs at the ends of short stout clavate peduncles; pedicels very short, slender; flowers white, tipped with pale lilac. *Calyx* membranous, hyaline; lobes ovate, ciliate, .025 in. long. *Corolla* urceolate; tube globose, about .05 in. long, glabrous on both surfaces, the mouth much contracted, forming a ridge within; lobes triangular, thickened, glabrous, erect. *Corona*-processes 5, very thinly membranous and hyaline, linear, with a spreading emarginate top with incurved broad flattened lobes. *Staminal-column* short, conical; appendages erect, acute; pollen-masses oblong, obtuse, seated on cornucopia-shaped flattened caudicles as long as themselves and joined by them to the oblong hard brown pollen-carriers. *Style-apex* pyramidal; tip somewhat capitate. *Follicles* (1 or 2 ?) linear-lanceolate, curved; tip recurved, 2 to 2.5 in. long, .25 in. broad; base slightly gibbous; pericarp thin, pale brown. *Seeds* cylindrical, .15 in. long by .025 in. broad; base winged and slightly bifid; testa very thin, brown; albumen rather copious; cotyledons ovate, fleshy, .05 in. long; radicle cylindric, thick, .075 in. long. Hook. f. Fl. Br. Ind. IV. 51. *D. albiflora*, Griff. Notul. IV. 47, and Ic. Pl. As. t. 410A, fig. 8; Beccari Malesia II. 263. *Collyris*

*major*, Vahl in Trans. Nat. Hist. Soc. Copenh. VI. 110; Wight Contrib. 66 (*in part*).

MALACCA: *Maingay* (K.D.) 1114 (perhaps also, but doubtfully, K.D. 1116, with rather large flatter leaves and frequent pustules); *Griffith* 3779. SINGAPORE: *Walker*.—DISTRIB. Burma (*Wallich* 4207), Java.

We do not feel (any more than, apparently, did the author of the Fl. Br. Ind.) quite sure of the identification of Griffith's specimens with those herein described (*Maingay* 1114), but believe that they correctly belong to this plant, representing terminal small-leaved sprays. *Conchophyllum imbricatum*, Bl. Bijdr. 1061, cannot be this species, as it is described as having no staminal corona-processes.

4. DISCHIDIA COCCINEA, Griff. Notul. IV. 45 (1854), and Ic. Pl. Asiat. CCCIX. A small creeping epiphyte, trailing over and rooting on the stems and branches of trees; stems slender, smooth or papillose or with rounded warts; rootlets very numerous and spreading. *Leaves* fleshy, coriaceous when dry, sessile; orbicular, convex above, the margins broadly recurved, wrinkled above and with prominent large bullate protuberances, pitted below by the protuberances and minutely papillose, white when young, red when old; .5 to 1 in. in diam.; midrib and 1 to 2 pairs of branching nerves prominent beneath. *Umbels* about 5- to 6-flowered, on short enlarged rachises at the ends of thick peduncles about .1 in. long; the peduncles in pairs in the axils of the leaf-pairs; pedicels slender, clavate, .15 to .2 in. long; buds broadly conical; flowers scarlet with lilac tips. *Calyx* membranous, hyaline; lobes very small, obtuse, glabrous. *Corolla* urceolate; tube gradually attenuate upwards from an inflated base, .1 in. long, slightly puberulous without, glabrous within, with an undulately 5-lobed ridge at a little above half height; lobes triangular-ovate, thickened, .03 in. long, glabrous. *Corona*-processes 5, membranous, linear, with an emarginate top bearing broad incurved lobes. *Staminal-column* slender; the anther-wings minutely horned; appendages ovate-acute, connivent over the style-apex; pollen-masses oblong, slender, attached by minute cup-shaped caudicles to the ovoid dark brown pollen-carriers. *Style-apex* 5-angled, conical with a subulate capitate tip. *Follicles* (usually 2) about 1 in. long, curved and much recurved, rather broad; pericarp crustaceous, smooth. *Seeds* obovoid, .05 in. long, the base minutely winged, the wing dentate; testa thin, pale brown; albumen scanty; cotyledons very small, 3 to 4 times smaller than the ovoid fleshy radicle. Hook. f. Fl. Br. Ind. IV. 51.

MALACCA: *Maingay* (K.D.) 1119; *Griffith* 3780. PERAK: at 4000 to 4500 feet near Larút, *King's Collector* 3840, 6905; at Gunong Ijuk, *Scortechini* 1185.

The chief peculiarity of this species is in its pollen-masses being elongate and having very small caudicles, and being therefore quite different from those of any other species we have examined. The Perak specimens have no flowers, and can therefore only be referred here tentatively, but we believe them to be correctly identified.

5. *DISCHIDIA RAFFLESIANA*, Wall. Pl. As. Rar. II. 35, t. 142 (1831), and Cat. 4208. A creeping epiphytic undershrub, milky, much branched, rooting on the trunks and branches of trees and often pendent from them; stems glabrous or slightly pubescent, terete, lower ones as thick as a goosequill. *Leaves* fleshy, coriaceous when dry, changing into pitchers; orbiculate or ovate-orbiculate, obtuse or mucronate sometimes acuminate at apex, rounded at base, slightly peltate; both surfaces glabrous; margins recurved; .75 to 1 in. in diam.; nerves faintly visible beneath; midrib slender; main nerves about 3 to 4 pairs, the lowest pair from the base and making an intramarginal nerve which the others join; petiole stout, flat, .15 to .25 in. long, sometimes longer; pitchers (*ascidia*) 2 to 5 in. long, fleshy, thick, oblong or ovate-oblong, slightly curved, obtuse, gibbous at base, the cavity filled with rootlets from the adjoining node. *Umbels* about 6- to 8-flowered, small, rounded, on a thickened tubercular rachis at the end of a long or short (usually .5 in. long) stout peduncle in the axil of the leaves; pedicels slender; buds ovoid; flowers pale yellow. *Calyx* membranous; lobes lanceolate, acute, ciliate, hirsute without. *Corolla* fleshy, urceolate; tube ovoid, pubescent without, .15 in. long; lobes short, obtuse, villous with somewhat retrorse stiff white hairs within, erect, .05 in. long. *Corona* of 5 processes, attached to the base of the staminal-column, each process on a stout base, deeply bilobed; lobes spatulate, incurved. *Staminal-column* short, conical; anther-cells parallel; appendages acuminate, erect, membranous; pollen-masses rather long, linear-oblong-spathulate, seated on cup-shaped clavate brown caudicles, which attach them to the oblong hardened dark pollen-carriers. *Follicle* 1, 2 to 3 in. long, curved, .3 in. broad below the middle, tapering thence to both ends; pericarp thin, smooth. *Seeds* .1 in. long, somewhat angled, oblong-obovate, narrowly winged on the margin, broadly winged and often dentate at base, truncate at tip, bearing a silky coma 1 in. or more long; albumen very scanty; cotyledons elliptic, obtuse, .025 in. long; radicle .5 in. long, cylindric. Griff. Notul. IV. 47, t. 386, fig. 6, and in Trans. Linn. Soc. XX. 387 and 391, tt. 17, 18; Dene. in DC. Prodr. VIII. 632; Miq. Fl. Ind. Bat. II. 512; Wight Contrib. 44; Hook. f. Fl. Br. Ind. IV. 50; K. Schum. in Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 228, fig. 87 (from *Wallich*); Beccari Malesia II. 263. *D. viridescens*, Griff. l. c. 49. *Collyris major*, Vahl in Trans. Nat. Hist. Soc. Copenh. VI. 110; Wight Contrib. 66 (*in part*).

PERAK: at Larút, *Kunstler*. MALACCA: on islands, growing on *Anacardium*, *Maingay* (K.D.) 1117. PAHANG: near Pekan and Kwala Pahang, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 320. SINGAPORE: *Wallich* 4208; *Kurz*; *Deschamps*; *Kunstler* (*King's Collector*) 1209.—DISTRIB. India (Cachar, Tenasserim), Borneo, Australia. A coast plant, abundant in dry spots near the sea, disappearing inland (*Ridley*). The pitchers are usually occupied by ants.

6. DISCHIDIA COMPLEX, Griff. Notul. IV. 50 (1854). A twining epiphyte, growing and rooting on the stems and branches of trees; stems very slender, terete. *Leaves* replaced by pitchers (*ascidia*), the pitchers subreniform, compressed, about 2 in. in diam., the orifice small, near the petiole, its margin inflexed, formed into a second pitcher much smaller than the outer one, opening on each side by an oblique opening deeply furrowed on the upper, carinate on the lower, side; the outer cavity filled with rootlets, the inner surfaces lurid purple. *Flowers* subumbellate, white, on thickened rachises at the ends of 1 to 3 in. long stout peduncles. *Corolla* with sub-globose tube, scarcely narrowed at the mouth; lobes broadly ovate, fleshy, inflexed; the throat of the corolla closed with a ring of hairs. *Corona*-processes with long narrow arms dilated at the tips. *Staminal-column* truncate; pollen-masses subobovate, attached by much dilated long keeled caudicles to the pollen-carriers (from Griffith). Hook. f. Fl. Br. Ind. IV. 51; Beccari Malesia II. 265.

MALACCA: *Griffith*, on trees.

7. DISCHIDIA BENGHALENSIS, Colebr. in Trans. Linn. Soc. XII. 357, t. 15 (1817). A fleshy epiphytic undershrub, rooting on the trunk and branches of trees, often matted and often hanging in flagelliform sprays; stems rather stout, as thick as a goosequill, glabrous, winged when dry. *Leaves* very fleshy, thick, subsessile; linear-oblong elliptic obovate or spathulate, obtuse and apiculate at apex, attenuate at base; .5 to 2 in. long, .25 to .75 in. broad; midrib and nerves scarcely ever visible, in dried specimens sometimes 3 to 5 pairs of main nerves at an acute angle with the midrib; petiole twisted, .1 to .15 in. long. *Umbels* axillary, very short-peduncled, about 10-flowered, usually on stout enlarged rachises; pedicels .05 to .1 in. long, slender; buds ovoid; flowers pale yellowish-white. *Calyx* fleshy; lobes ovate, .03 in. long. *Corolla* urceolate, glabrous on both sides; tube globose, .05 to .1 in. in diam.; lobes triangular, acute, .03 in. long, thickened within. *Corona* of 5 slender processes, membranous; stalk linear, branching in 2 falcate recurved subulate laciniae. *Staminal-column* short; anther-wings spreading; appendages short, connivent; pollen-masses falcate, truncate above, joined by a curved cup-shaped caudicle half as long as

themselves to the narrow ellipsoid pollen-carriers. *Style-apex* pyramidal. *Follicles* usually 1 only, very slender, straight, acuminate, 1·5 to 2·5 in. long, ·15 in. broad; pericarp thin, smooth. *Seeds* almost cylindric, only slightly compressed at the sides, rounded and minutely denticulate below, ·1 in. long, truncate at tip and bearing a copious white silky coma; testa thin, pale brown; albumen very scanty; cotyledons fleshy, ovate, ·05 in. long from a broad base; radicle stout, nearly as large. Spreng. Syst. Veg. I. 844; Wight Contrib. 43; Dene. in DC. Prodr. VIII. 631; Bot. Mag. t. 2916; Hook. f. Fl. Br. Ind. IV. 50. *D. cuneifolia*, Wall. Cat. 4206; Dene. l. c. 633. *D. spatulata*, Blume Bijdr. 1060; Miq. Fl. Ind. Bat. II. 512.

PERAK: *Scortechini* 1188; *King's Collector* 5751. SINGAPORE: *Maingay* (K.D.) 1121.—DISTRIB. India (E. Nepal, Sikkim, Assam and southwards), Java, Borneo.

8. DISCHIDIA NUMMULARIA, Br. Prodr. Fl. Nov. Holl. I. 461 (1810). A very slender epiphytic herb, rooting on the trunks and branches of trees; stems farinose, sometimes papillose or minutely puberulous, grey. *Leaves* fleshy, coriaceous when dry, farinose; orbicular, acute obtuse or apiculate at apex, rounded at base or sometimes slightly cuneate; under surface more or less papillose; margins often recurved; ·25 to ·75 in. in diam.; midrib and 2 to 3 pairs main nerves much branching, reticulating, scarcely visible even when dry; petiole 0 to ·05 in. long. *Umbels* few-flowered, lateral, on short rachises and short thick peduncles or nearly sessile; pedicels ·06 in. long; buds ovoid; flowers scarlet. *Calyx*-lobes minute, acute, membranous. *Corolla* urceolate; tube ·075 in. long, globose; throat villous within, with often retrorse hairs; lobes linear-subulate, ·025 in. long, erect, thickened. *Corona* of 5 processes attached to the base of the staminal-column, each process linear below, bifid above in 2 recurved spatulate lobes. *Staminal-column* short, conical; anther-wings conspicuous; anther-cells parallel; appendages membranous, acute; pollen-masses oblong-ellipsoid, attached by broad curved caudicles as long as themselves to the small brown horny pollen-carriers. *Style-apex* 5-lobed; tip conical. *Follicles* slender, curved, linear-lanceolate, long-acuminate, broad near the base (·6 in. when open); pericarp chartaceous, brown, smooth. *Seeds* flask-shaped, ·05 in. long, truncate at the tip and bearing a 1 in. long white silky coma; testa thin. Wall. Cat. 4204; Wight Contrib. 43; Dene. in Nouv. Ann. Mus. Par. III. 378, and DC. Prodr. VIII. 632; Bl. Bijdr. 1059; Miq. Fl. Ind. Bat. II. 507; Benth. Fl. Austral. IV. 345; Hook. f. Fl. Br. Ind. IV. 49; Beccari Malesia II. 2671, t. lxiii. 7 to 11; Prain Beng. Plants 699. *D. orbicularis*, Dene. l. c.; Miq. l. c. *Collyris minor*, Vahl in Act. Soc. Hafn. VI. 111; Wight Contrib. 67. *D. Gaudichaudii*,

Dene. *l. c.*; Miq. *l. c.* 508. "*Nummularia lactea minor prima*," Rumph. Herb. Amb. V. 472, t. 176, fig. 1.

PENANG: *Curtis*; *Wallich* 4204A. PERAK: *Scortechini* 1109. MALACCA: *Griffith* 3778; *Maingay* (K.D.) 1118. PAHANG: in heath country *Ridley* (see Trans. Linn. Soc., Ser. 2, III. 321). SINGAPORE: *Hullett* 136, 822; *King's Collector* 1270.—DISTRIB. India (Cachar, Chittagong, Tenasserim and Andaman Islands), Malay Archipelago, Australia. "A most noxious epiphyte in Singapore, draping and eventually killing trees" (*Ridley, l. c.*).

*Scortechini* 1135 is probably this species, but the leaves are slightly ovate. The specimen has no flowers. We cannot separate *D. Gaudichaudii* even by the retrorse hairs in the throat of the corolla, for the character is most difficult to be sure about in such minute flowers, and otherwise there seems to be no point of difference.

9. DISCHIDIA ALBIDA, Griff. Notul. IV. 46 (1854). A slender twining epiphytic herb or undershrub, rooting on the trunks and branches of trees; stems very slender, scabrid-puberulous or glabrous. *Leaves* fleshy, coriaceous when dry; ovate-acute and mucronate at apex, rounded or cordate and slightly peltate at base; glabrous and shining on both surfaces; margins slightly recurved; .5 to .75 in. long, .4 in. broad; nerves very faint when dry; midrib slender; main nerves 3 to 4 pairs, the lowest pair opposite starting from the base and forming an intramarginal looped nerve up to the apex, the remaining 2 to 3 pairs nearly horizontal joining the intramarginal nerve at the sinuses of the loops; reticulations few, netted; petiole stout, .1 to .15 in. long, puberulous. *Umbels* few-flowered, on minutely tubercular, more or less thick and elongated, rachises at the ends of .5 to .75 in. long rather stout peduncles; pedicels none or very slender, up to .06 in. long; buds ovoid, acute; flowers white tipped with pink. *Calyx* membranous; lobes ovate-acute, .04 in. long; scales minute. *Corolla* urceolate; tube ovate-globose, .15 in. long, white-villous at the throat; lobes triangular, erect, very small, with thickened margins. *Corona* very small, membranous, of 5 processes attached to the base of the staminal-column, linear, bifid; the lobes broad, flat, recurved. *Staminal-column* rather long, obconic below, conic above; base with a rounded protuberance; anther-wings prominent; anther-cells parallel; appendages acuminate; pollen-masses ellipsoid, granular, seated on cornucopia-like flattened caudicles as long as themselves, which connect them with the ovoid-oblong rather large brown pollen-carriers. *Style-apex* with conical tip. *Follicles* "very long-beaked, deeply channelled on the inner face" (*Griffith*). "*Seeds* with very long slender coma" (*Griffith*). Hook. f. Fl. Br. Ind. IV. 50.

PERAK: at Bujong Malacca, *Curtis*; Ulu Batang Padang and Gunong Batu Pateh, 3000 to 5000 ft., *Wray* 970, 1519; on Maxwell's Hill and at Thaiping, *Scortechini* 86, 313, 1227. MALACCA: at Toondook, *Griffith* 3781. JOHORE: at Gunong Pulai, 1800 ft., *G. King*.

10. DISCHIDIA HIRSUTA, Dene. in DC. Prodr. VIII. 632 (1844). A slender epiphytic trailing herb, rooting on the trunks and branches of trees; stems minutely papillose and slightly hispid-pubescent, nearly white when dry, scarcely ever over .05 in. in diam. *Leaves* fleshy, coriaceous and very pale when dry; broadly ovate, acute and mucronate at apex, rounded at base and slightly peltate; shining and lacunose above, minutely papillose beneath; margins recurved, often hispid-ciliate; .5 to 1 in. long, .5 to .7 in. broad; midrib and 2 to 3 pairs of main nerves prominent above when dry, the nerves horizontal, meeting a looped intramarginal nerve close to the edge; petiole very short, papillose. *Cymes* umbellate, 2- to 3-flowered, on very short rachises at the ends of short .15 to .2 in. long papillose axillary peduncles; buds ovoid; flowers dull red, the tube dark blood-red, the lobes rose-coloured. *Calyx* spreading; lobes membranous, ovate, .05 in. long; scales minute. *Corolla* urceolate; tube .2 in. long, globose below, contracted at the mouth, furnished within with a row of tufts of hair half-way up and two further rows at the throat, the lower alternate with, the upper opposite to, the short ovate-acute lobes, which are .05 to .1 in. long and bear 5 adnate fleshy scales behind the tufts of hair. *Corona* of 5 rather large very membranous processes from the back of the staminal-column between the wings, slender below, broad and bifid and recurved above; the lobes broadly rounded. *Staminal-column* conical; the anther-wings prominent, rounded at base; anther-cells parallel; appendages acuminate, membranous, erect; pollen-masses oblong-clavate, obtuse, seated on upcurved brown caudicles with cup-like top, which are half as long as the pollen-masses and connect them to the large conical dark brown pollen-carriers. *Style-apex* very soft; tip long-conical. *Follicles* "3 in. long, curved, linear-lanceolate, glabrous" (*Scortechini*). *Miq.* Fl. Ind. Bat. II. 599; *Hook. f.* Fl. Br. Ind. IV. 50; *Bot. Mag.* t. 7853. *D. fasciculata*, Dene. l. c.; *Miq. l. c.* *D. Brunoniana*, *Griff.* Notul. IV. 44, and *Ic. Pl. Asiat.* t. 410A, fig. 1 (somewhat incorrect). *Leptostemma hirsutum* and *fasciculatum*, *Blume Bijdr.* 1058.

PENANG: at Bato Fereng, *Curtis* 1897. PERAK: at Waterfall Hill, *Wray* 137; *Scortechini* 180; at Larut, 200 to 300 ft., *King's Collector* 6691. DINDINGS: at Pangkore Island, *Scortechini* 1077. MALACCA: *Griffith*; *Maingay* (K.D.) 1120. SINGAPORE: *Ridley* 2730.—DISTRIB. Burma (in Tenasserim (*Helper*), at Mergui in mangrove forests (*Griffith* 3782)), Java, Borneo.

11. *DISCHIDIA ACUTIFOLIA*, Maingay MS.; Hook. f. Fl. Br. Ind. IV. 51 (1883). A slender twining epiphytic undershrub, rather distantly rooting on the stems and branches of trees; stems terete, glabrous, striate when dry. *Leaves* coriaceous, pergamaceous when dry; lanceolate or ovate-lanceolate; shining and glabrous on both surfaces; margins recurved; 2·5 to 4 in. long, .75 to 1·25 in. broad; midrib slender, impressed above when dry; main nerves 6 to 8 pairs, the lowest pair close to the lower margin, all at from 40° to 60° with the midrib, straight or curving to join an intramarginal looped nerve; reticulations netted; petiole stout, .25 in. long. *Umbels* few-flowered, in pairs on thickened rachises at the ends of .5 to 1·5 in. long peduncles; pedicels very short; buds conical; flowers pale yellow with pink tips. *Calyx* very thin, membranous, hyaline; lobes ovate-acute, .025 in. long. *Corolla* urceolate; tube globose, .05 in. long, throat with a row of usually erect stiff hairs; lobes as long, villous within, triangular, acute, thickened. *Corona* of 5 exceedingly thin membranous hyaline processes; stem subulate from a broad base, top obtuse, rounded, with 2 rather short spatulate recurved arms. *Staminal-column* somewhat elongate, filament portion membranous; anther-wings rounded; appendages crenate with erect acuminate tips; pollen-masses oblong, truncate, on cornucopia-shaped curved caudicles as long as themselves, and connected by them to the very slender lanceolate brown pollen-carriers. *Style-apex* pyramidal. *Fruit* not known.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 1122.

We were only able to dissect one flower, and that with some difficulty. In his MS. notes (Vol. IV. pp. 48, 67) Maingay says: "Leaves of staminal-corona minute, so closely adpressed to the anthers that I question if in dried specimens of so minute a plant (flower?) they could be discoverable at all; obtuse with short brachia." The corona-processes are, in fact, excessively thin, but they can be separated with care.

12. *DISCHIDIA CORDIFOLIA*, King & Gamble, n. sp. A creeping epiphytic undershrub, rooting on the trunks and branches of trees; stems about as thick as a crowquill, terete; internodes long. *Leaves* fleshy, thinly coriaceous when dry; ovate, bluntly acute at apex, rounded or slightly cordate at base; both surfaces glabrous; margins slightly recurved; 1·5 to 2·5 in. long, 1 to 1·75 in. broad; 5- to 7-nerved at the base; midrib slender; marginal pair of nerves very short and faint, second pair curving up to about half the length of the leaf, third pair at an angle of about 30° with the midrib, curving near the margins to form an intramarginal nerve rejoining the midrib a little below the tip; other main nerves none; secondary nerves about 2 pairs; reticulations irregularly netted; petiole .5 in. long, broad, flattened. *Umbels* few-flowered, in pairs on tubercular rachises about .15 in. long at the ends of stout



peduncles .5 in. long; pedicels very short, slender; buds ovoid. *Calyx* membranous; lobes ovate-acute, .05 in. long; scales small. *Corolla* campanulate; tube .1 in. long, glabrous on both sides; lobes .075 in. long, thickened, glabrous. *Corona* of 5 very thin hyaline processes, about .04 in. long from the back of the anthers between the wings, linear-stalked with orbicular rounded tops and sagittate lobes. *Staminal-column* attached to the base of the corolla-tube; filament part short; anther-cells parallel; appendages short, acute; pollen-masses ellipsoid, on caudicles nearly as long as themselves, which attach them to the narrowly oblong pollen-carriers; the caudicles curved upwards to a cup-like oblique mouth, and broadly membranously winged on the inside. *Style-apex* short, blunt. *Fruit* not known.

PERAK: at Maxwell's Hill, 3000 ft., *Scortechini* 424, 516.

13. *DISCHIDIA MONTICOLA*, King & Gamble, n. sp. A trailing epiphytic undershrub, rooting at intervals on the trunks and branches of trees; stems slender, terete; internodes long. *Leaves* fleshy, thinly coriaceous when dry; ovate or ovate-lanceolate, acuminate at apex, rounded or attenuate at base; both surfaces glabrous; margins slightly recurved; 1.5 to 3.5 in. long, .75 to 1 in. broad; 5-nerved; the midrib slender; outer pair of basal nerves short, reaching about the middle of the leaf, second pair at an angle of about 20° with the midrib, forming a looped intramarginal nerve till close to the midrib; main nerves 2 to 3 pairs, short, inconspicuous, joining the midrib to the sinuses of the looped nerve; reticulations netted, irregular; petiole .25 in. long, somewhat twisted. *Umbels* few-flowered (?), in pairs on tubercular rachises .2 to .3 in. long at the end of a .75 to 1.75 in. long straight lateral peduncle; pedicels very short, slender; buds ovoid; flowers pale green (Wray). *Calyx* membranous; lobes ovate-acute, puberulous without, .05 in. long; scales rather large. *Corolla* campanulate, .125 in. long; tube glabrous; lobes also glabrous, thickened, scarcely over .025 in. long. *Corona* of 5 very thin membranous processes, each linear-stalked with a rounded bluntly sagittate head. *Staminal-column* short; anther-wings broad; anther-cells parallel; appendages very long-acuminate; pollen-masses ellipsoid, on cornucopia-shaped caudicles as long as themselves, which connect them to the slender oblong pollen-carriers. *Style-apex* with a short conical tip. *Fruit* not known.

PERAK: at camp on Ulu Batang Padong, 4900 feet, Wray 1503; on Canfield's Hill, 4000 feet, *Scortechini* 423, &c.

Scortechini has marked his specimens "*D. sagittata*, Dene.," but they do not agree at all well with the descriptions in DC. Prodr. VIII. 631. There are no specimens of *D. sagittata* in the Kew Herbarium, but the descriptions give the leaves as obtuse at apex and attenuate into the petiole at base, which hardly suits

*D. monticola*. In the glabrous flowers *D. monticola* and *D. cordifolia* come very near to each other.

14. *DISCHIDIA SCORTECHINII*, King & Gamble, n. sp. A slender glabrous creeping epiphytic undershrub, sparingly rooting on and often pendulous from the trunks and branches of trees; stems terete; internodes long, 2 to 4 in. or more. *Leaves* fleshy, pergamaceous when dry; ovate-lanceolate, attenuately acuminate at apex, rounded at base; glabrous on both surfaces; 2 to 2.5 in. long, about .5 in. broad; 3- to 5-nerved; midrib slender, raised beneath, sometimes with a gland at the base; lowest pair of nerves short and faint; next pair prominent forming an intramarginal looped nerve .1 to .15 in. from the midrib nearly or quite to the tip; main nerves about 4 to 5 pairs, leaving the midrib at nearly right angles, and joining the intramarginal nerve at the loop-sinuses; reticulations netted; petiole .15 to .20 in. long, rugose. *Umbels* few- (5- to 6-) flowered, on short rounded tubercular thick rachises at the ends of stout axillary .3 in. long peduncles; pedicels reddish, slender, .05 in. long; buds lanceolate-ovoid, .15 to .2 in. long; flowers white tipped with scarlet. *Calyx* membranous; lobes ovate-acute, .05 in. long, slightly puberulous without; scales very minute. *Corolla* urceolate; tube ovoid, glabrous without, pubescent above within, .125 in. long; throat gradually contracted; lobes erect, .1 in. long, thickly villous within, especially in their lower half. *Corona* of 5 exceedingly thin membranous processes, attached to the backs of the anther part of the column, each process on a narrow base, soon spreading into a rounded obtusely sagittate tip. *Staminal-column* rather long; filament portion free; anther-wings broad, shining, horny; anther-cells parallel, with acuminate, erect, connivent, membranous appendages; pollen-masses oblong-ellipsoid, attached by slender caudicles as long as themselves to the very narrow slender pollen-carriers; the caudicles cornucopia-shaped, with a narrow membranous wing on the inside edge. *Style-apex* long-conical, membranous. *Follicles* not known.

PERAK: *Scortechinii* 543.

We at first thought that this was *D. lanceolata*, Dene. (*Leptostemma lanceolatum*, Bl. Bijdr. 1057), but in that species the bases of the leaves are markedly attenuate into the broad flat petiole, and the venation is more strongly 3- to 5-nerved.

15. *DISCHIDIA TUBULIFLORA*, King & Gamble, n. sp. A slender creeping epiphytic undershrub, rooting on the trunk and branches of trees; stems wiry, puberulous. *Leaves* fleshy, coriaceous when dry; ovate or ovate-lanceolate, acute or acuminate at apex, rounded at base; glabrous on both surfaces, shining above and wrinkled when dry; margins recurved; .75 to 1.25 in. long, .3 to .6 in. broad; nerves only

clear on under-surface when dry; midrib slender, with usually a gland at the base above; main nerves 3 to 5 pairs, acutely curved to join in a looped intramarginal nerve; petiole .1 to .25 in. long, pubescent. *Umbels* few-flowered, on a cylindrical tubercular rachis about .25 in. long at the end of a thick .15 in. long peduncle; buds slender, cylindric-clavate, reaching .4 to .5 in. long. *Calyx* membranous; lobes ovate-acute, .05 in. long, pubescent without. *Corolla* tubular, urceolately inflated below, then contracted in a neck having a small swelling in the middle; glabrous without, glabrous within, except a densely villous ring at the swelling; tube .3 to .4 in. long; lobes linear, erect, .1 to .15 in. long, villous within. *Corona* of 5 exceedingly thin hyaline processes, which are inserted between the anther-wings, have narrow stalks, and are broadly rounded above and sagittate below. *Staminal-column* elongated; filament part cylindric, .075 in. long; anther-wings horny, tailed at base; anther-cells parallel, with long-acuminate erect connivent appendages; pollen-masses oblong-ellipsoid, on slender caudicles as long as themselves, and connecting them with the ovoid-acute pollen-carriers; the caudicles cornucopia-shaped, and having a hyaline inner margin. *Style-apex* long, subulate-acuminate. *Follicle* 1, slender, curved, 2 in. long, .1 in. broad, acuminate at tip; pericarp thin, striate, glabrous. *Seeds* minute, linear, .1 in. long, tipped with a white silky coma; testa thin, pale.

PERAK: *Scortechini* 256, 465; *King's Collector* 2100.

The description is from *Scortechini* 465, the only specimen with flowers and fruit, and the only one, consequently, quite certain.

#### SPECIES OF WHICH LEAVES ONLY KNOWN.

16. *DISCHIDIA DESCHAMPSII*, King & Gamble, n. sp. A twining apparently epiphytic undershrub, rooting on the stems and branches of trees; branches slender, terete. *Leaves* coriaceous; elliptic or elliptic-ovate, bluntly acute at apex, somewhat rounded at base; glabrous on both surfaces and somewhat shining; margins recurved; 1.5 to 3 in. long, .75 to 1 in. broad; midrib slender, raised beneath when dry; main nerves about 5 pairs, the lowest pair from the base forming a looped intramarginal nerve, which is joined at its sinuses by the others, which are at an angle of about 70° with the midrib; reticulations irregular, prominent, all raised on both surfaces when dry; petiole thick, .15 to .25 in. long. *Umbels* on thickened rachises often .5 to .75 in. long, at the ends of stout peduncles about 1 in. long. *Flowers* and *Fruit* unknown.

SINGAPORE: roadsides, *Deschamps*.

## 29. PYCNORHACHIS, Benth.

A hairy twining undershrub. *Leaves* opposite. *Flowers* in reflexed pairs, spirally disposed round the long fleshy branches of an axillary racemiform cyme. *Calyx* 5-partite; scales 5 to 10. *Corolla* turbinate, with short tube, deeply 5-fid; lobes valvate, slightly twisted to the left. *Corona*-scales 5, spreading at the base of the staminal-column opposite the anthers. *Staminal-column* short, adnate to the middle of the corolla-tube; anthers erect, with membranous, hyaline appendages; pollen-masses 1 in each cell, long, slender, cylindric, waxy, erect, attached by short caudicles to the pollen-carriers. *Ovary* of 2 carpels, sunk in the calyx-tube; style-apex 5-angled, obtusely conical, much shorter than the anthers. *Fruit* of curved, smooth, cylindric, obtuse follicles. *Seeds* comose.—DISTRIB. One species only.

PYCNORHACHIS MAINGAYI, Hook. f. in Fl. Br. Ind. IV. 63 (1883). Branches flexuose, hispid with spreading tawny hairs. *Leaves* oblong-obovate, abruptly cuspidate-acuminate at apex, narrowly cordate at base; both surfaces hispidly hairy with bulbous-based hairs, especially on the nerves; 4 to 6 in. long, 1·5 to 2 in. broad; midrib prominent beneath; main nerves 10 to 12 pairs, curving upwards and joined by prominent transverse reticulations; petiole ·25 to ·5 in. long, villous. *Cymes* 3 to 6 in. long; peduncle 1 to 2 in. long, thick; branches usually 1 to 3, ·3 in. in diam. minutely pubescent flower-pairs on rounded tubercles; pedicels short; buds conical, long-acuminate. *Calyx* minutely red-hairy without, glabrous within; lobes linear-lanceolate, ·1 in. long. *Corolla* deep purple; tube very short, thickened, with a fringed annulus; lobes about ·25 in. long, subulate-lanceolate from a broad base. *Corona* of 5 thickened fleshy obtuse processes on the backs of the anthers. *Staminal-column* short; appendages long, subulate, hyaline; pollen-masses clavate, slender, attached by minute caudicles to the bases of the linear clavate pollen-carriers. *Style-apex* deeply 5-lobed; the lobes running up to a rounded apiculus. *Follicles* 5 in. long, ·7 in. broad, cylindric, curved in sickle-shape; pericarp glabrous. *Seeds* comose.

MALACCA: *Maingay* (K.D.) 1141.

The description, like that of Fl. Br. Ind., is chiefly taken from the full notes given in *Maingay* MS. Vol. IV. 64.

## Tribe V.—CEROPEGIÆ.

Stamens with their filaments connate into a tube, and adnate to the style-apex at the top. Anthers erect or incumbent over the style-apex, with or without appendages. Pollen-contents of each anther-cell united in a waxy mass; pollen-masses pellucid on the margin or at

the apex, attached in pairs to the carriers by short caudicles, erect or horizontal in the cells, never pendulous.

Corona double: outer corolline, of small processes in the sinuses of the corolla-lobes; inner staminal, annular; flowers small; corolla rotate .. .. . 30. LEPTADENIA.

Corona double, both staminal: outer cup-shaped, inner usually erect, subulate; flowers rather large; corolla tubular .. . 31. CEROPEGIA.

### 30. LEPTADENIA, R. Br.

Shrubs, twining or erect, and then with stiff much-branched rush-like stems. *Leaves* opposite, variable, sometimes absent. *Flowers* small, in umbellate, lateral, sessile or pedunculate, many-flowered cymes. *Calyx* 5-lobed to the middle or further; scales absent. *Corolla* deeply 5-lobed, rotate or with a short campanulate tube and spreading lobes; valvate in bud. *Corona* double; outer corolline, of 5 short transverse or rounded fleshy processes alternating with the lobes of the corolla at the sinuses; inner staminal, of a raised undulate fleshy ring at the base of the staminal-column. *Staminal-column* arising from the tube of the corolla, to which the filaments are sometimes adnate; anthers incumbent on the style-apex, with minute or no appendages; pollen-masses 1 to each anther-cell, suberect or erect, ovoid, with a pellucid apex, attached in pairs by fleshy caudicles to the pollen-carriers. *Ovary* of 2 distinct carpels; style-apex conical, with a 5-angled base; tip often bifid. *Fruit* of usually 1 thick smooth follicle. *Seeds* small, ovate-oblong, comose.—**DISTRIB.** Five or six species, three being twiners and two erect shrubs. Four species are found in Central Africa, one extending through Egypt and Arabia into Western India, one in Madagascar, and one in India and Malaya.

LEPTADENIA RETICULATA, W. & A. in Wight Contrib. 47 (1834). A hoary twining shrub; stems with corky deeply cracked bark; branchlets terete, glabrous or hoary-puberulous. *Leaves* thinly coriaceous; sub-deltoid or ovate or ovate-oblong or ovate-lanceolate, acute at apex, rounded or cuneate at base; both surfaces pale, glabrous or more or less finely pubescent; 1.5 to 3 in. long, .75 to 1.75 in. broad; midrib rather broad, without basal glands, but sometimes with a minute tuft of hair at the base; main nerves 5 to 7 pairs, spreading, faint; reticulations netted, obscure; petiole .25 to .75 in. long. *Cymes* many-flowered, hoary-puberulous, shorter than the leaves, often in pairs on the peduncles; peduncles .25 to .75 in. long; bracts minute, clustered at the thickened bases of the umbels; pedicels slender, up to .5 in. long; buds globose; flowers greenish-yellow. *Calyx* rotate-campanulate, divided to about the middle, pubescent without; lobes ovate-oblong,

·05 in. long. *Corolla* rotate, with a short tube; lobes thick, ovate-lanceolate, ·1 in. long, pubescent, and with a small hairy protuberance on the inner face near the tip. *Corona*: corolline of 5 fleshy truncate or acute processes at the sinuses, villous on the back and tips; staminal of a sometimes obscure, annular, undulate, ring below the anthers. *Staminal-column* adherent below to the corolla-tube; filaments united, thin; lower part of anthers thickened, upper part incumbent over the style-apex; appendages minute; pollen-masses ovoid, reticulate, with a pellucid apex, attached by moderately long, often elastic, clavate, pellucid caudicles to the small oblong pollen-carriers. *Style-apex* 5-rayed, conical, sometimes bifid. *Follicles* subwoody, 2·5 to 3·5 in. long, ·75 in. broad, lanceolate, with a blunt shortly curved beak, keeled on the ventral surface; pericarp smooth, pale grey when dry, thick. *Seeds* narrowly ovate-oblong, acute, infolded, broadly winged, ·25 in. long, ending in a 1 to 1·5 in. long white silky coma; testa thick; cotyledons fleshy; embryo small. Wight Ic. t. 350; Wall. Cat. 8197; Dcne. in DC. Prodr. VIII. 628; Miq. Fl. Ind. Bat. II. 503; Dalz. & Gibs. Bomb. Fl. 152; Hook. f. Fl. Br. Ind. IV. 63; Trimen Fl. Ceyl. III. 164; Cooke Fl. Bomb. II. 172. *L. appendiculata*, Dcne. l. c.; Miq. l. c. *L. imberbis*, Wight Contrib. 48; Wall. Cat. 8198; Dcne. l. c. *L. brevipes*, Wight Cat. 1536. *Cynanchum reticulatum*, Retz. Obs. II. 15. *C. asthmaticum*, Herb. Ham. 766. *Secamone canescens*, Smith in Rees Cycl. *Asclepias suberosa*, Roxb. Fl. Ind. II. 38. *Gymnema aurantiaca*, Wall. MSS.

SINGAPORE: *Lobb* 333.—DISTRIB. Northern Western and Southern India, Burma, Ceylon.

*Lobb's* specimen has ovate-lanceolate leaves, acute corolline corona-processes, and almost no trace of the ring forming the staminal-corona, but otherwise appears to be the same as the Indian plant.

### 31. CEROPEGIA, Linn.

Perennial herbs, erect or twining. *Rootstock* a tuber or a fascicle of thick fleshy roots. *Leaves* opposite, sometimes minute or 0. *Flowers* usually moderate-sized or large, of various often singular forms, solitary, in pairs or in umbellate or racemose cymes, lateral, rarely terminal. *Calyx* 5-partite, with 5 glandular scales within. *Corolla* tubular, usually more or less inflated at the base, straight or curved, 5-lobed; the lobes free or more or less connate at their tips, valvate in bud. *Corona* double, arising from the staminal-column; outer cup-shaped, entire or 5- to 10-toothed, or of 5 bifid lobes more or less adnate to the inner corona-lobes and often appearing to form one

series with them, or reduced to minute pouches alternating with the stamens; inner of 5 short or long processes opposite the anthers and incumbent on them or erect, dorsally adnate at their base to the cup of the outer corona or laterally to its lobes, when the corona appears to be formed of 5 lobes with a tooth on each side at their base. *Staminal column* arising a little above the base of the corolla, short and, with the corona, included in its inflated basal part; anthers erect, ascending or incumbent on the top of the style-apex, without appendages; pollen-masses erect, ascending or subhorizontal, 1 in each anther-cell, subsessile on, or attached in pairs by short caudicles to, the pollen-carriers. *Ovary* of 2 carpels; style-apex truncate or shortly conical, not exserted. *Fruit* of 1 or 2 lanceolate or linear-fusiform, acuminate, smooth follicles. *Seeds* comose.—**DISTRIB.** A large genus of 80 or more species, found in Africa, India, Malaya and Tropical Australia.

*CEROPEGIA LUCIDA*, Wall. Pl. As. Rar. II. 33, t. 139 (1831), and Cat. 8133. A twining shrub, with irregularly fascicled fibrous roots; branchlets glabrous, smooth, more or less angular when dry. *Leaves* fleshy when green, membranous when dry; ovate- or oblong-lanceolate, acuminate at apex, acute or somewhat obtuse at base; glabrous on both surfaces; 4 to 7 in. long, 1.5 to 3 in. broad; midrib slender; main nerves 6 to 7 pairs, obscure, acutely curving upwards; reticulations irregular, scarcely visible; petiole .5 to 1.5 in. long. *Cymes* up to 3 in. long, 1 to 3 together at the nodes; peduncles reddish, stout, 1 to 2 in. long, bearing umbellate racemes with a .25 to .5 in. long thickened rachis, and with white rounded glands and linear-subulate bracts; pedicels slender, .5 in. long; flowers green, spotted with purple in the tube and with purple-brown tips to the lobes. *Calyx* very deeply cleft; lobes linear-subulate, slender, recurved, .4 to .5 in. long; glandular scales rather large, ovate, flat. *Corolla* 1.5 to 2 in. long, curved, glabrous without, also within, except at the base of the tube, which is sparsely villous; tube scarcely inflated below, broadly funnel-shaped below the lobes; lobes lanceolate, at first spreading, afterwards inflexed and connate at the dilated long-ciliate tips. *Corona*-processes: outer 10-lobed, lobes short, triangular, long-ciliate; inner linear-spathulate, connivent at the tips. *Staminal-column* short; pollen-masses nearly globose, subsessile on the clavate pollen-carriers. *Style-apex* 5-angled; apiculus conical. *Fruit* not seen. Wight Contrib. 33; Dene. in DC. Prodr. VIII. 641; Hook. f. Fl. Br. Ind. IV. 73.

**PENANG:** at Penara Bukit, 1000 ft., *Curtis* 1007.—**DISTRIB.** India (Silhet and Cachar), Burma.

## Family LXXVII. LOGANIACEÆ.

Trees, shrubs or herbs, sometimes climbers. *Leaves* opposite, rarely ternate, simple; stipules various or absent. *Flowers* hermaphrodite or, by abortion, subdioecious, in terminal or axillary, simple or compound, cymes; the cymes sometimes subcapitate or reduced to solitary flowers. *Calyx* small, inferior, its limb imbricately 4- or 5-toothed or -lobed. *Corolla* tubular, funnel-shaped or campanulate; limb with 4 or 5 lobes or teeth, imbricate, valvate or contorted. *Stamens* 4 or 5, inserted on the corolla-tube, alternate with the lobes; anthers 2-celled, their dehiscence introrse, longitudinal, rarely 1-celled, divaricate, with confluent tips. *Carpels* 2, connate into a free 2-celled ovary; ovules 1 or more in each cell; placentas on the septum or basal at the inner angle; style simple; stigma capitate, 2-fid or 2-partite. *Fruit* a septicidal capsule or a berry, 1- to many-seeded. *Seeds* various; albumen fleshy or cartilaginous; embryo straight.—DISTRIB. About 450 species; tropical and sub-tropical.

Ovary with many ovules in each cell (Tribe I. EULOGANIÆ):—

Herbs; corolla valvate; capsule didymous:—

- |                                              |    |                |
|----------------------------------------------|----|----------------|
| Cymes 2- or 3-chotomous; flowers 5-merous .. | .. | 1. MITREOLA.   |
| Flowers solitary or clustered, 4-merous ..   | .. | 2. MITRASACME. |

Shrubs (often scandent) or trees:—

Fruit dehiscent, capsular, 2-celled:—

- |                            |    |              |
|----------------------------|----|--------------|
| Corolla-lobes imbricate .. | .. | 3. BUDDLEIA. |
| Corolla-lobes valvate ..   | .. | 4. NORRISIA. |

Fruit indehiscent:—

- |                                          |    |               |
|------------------------------------------|----|---------------|
| Corolla-lobes contorted in æstivation .. | .. | 5. FAGRÆA.    |
| Corolla-lobes valvate in æstivation ..   | .. | 6. STRYCHNOS. |

Ovary with a single ovule in each cell (Tribe II. GAERTNERIÆ) 7. GAERTNERA.

## 1. MITREOLA, Linn.

Herbs with opposite membranous leaves and small or membranous stipules. *Cymes* 2- to 3-chotomous, terminal, or peduncled and axillary. *Flowers* small, white, often secund on the ultimate branches of the cymes. *Sepals* lanceolate. *Corolla* urn-shaped, with 5 small valvate lobes. *Stamens* 5, included. *Ovary* 2-celled; styles 2, short, at first connate and crowned by the small hairy stigma, ultimately divergent; ovules many in each cell, attached to peltate placentas. *Capsule* obovoid, laterally compressed, truncate or 2-horned; carpels dehiscing by separating from above downwards from each side of the septum. *Seeds* numerous, minute, globose or elongate; albumen fleshy; embryo linear.—DISTRIB. Species 4; 2 of them American, 2 Asiatic.

1. MITREOLA OLDENLANDIOIDES, Wall. Cat. 4350 (1829). Annual,



erect, 6 to 18 in. high. *Leaves* linear-lanceolate, narrowed at both ends, nearly glabrous, about 2 in. long and .75 in. broad; petiole .25 in. long. *Cymes* 2 to 6 in. long, often numerous, terminal and axillary, dichotomous; bracts lanceolate, less than .1 in. long. *Flowers* subsessile, under .1 in. long; capsules 2-horned, secund. *Seeds* twice as long as broad, trigonous. A. DC. Prodr. IX. 9; Hook. Ic. Plant. 827; Miq. Fl. Ind. Bat. II. 360; Benth. in Journ. Linn. Soc. I. 91; Clarke in Hook. f. Fl. Br. Ind. IV. 79. *M. paniculata*, Wall. Cat. 4349; Wight Ic. 600 (*inaccurate*); A. DC. l. c. *M. inconspicua*, Zoll. et Mor. Vers. (1845 to 1846) 55.

Said to occur in Kedah, but no specimen seen.—DISTRIB. Andaman Islands, Burma, Central Provinces of British India, Malay Archipelago, Australia.

## 2. MITRASACME, Labill.

Small herbs, with opposite leaves and stipules forming a minute sheath. *Flowers* small, white, terminal or axillary, solitary, clustered or in irregular umbels. *Calyx* campanulate, 4-fid. *Corolla* urceolate, with 4 valvate or reduplicate sometimes spreading lobes. *Stamens* 4, included; filaments rather short, adnate to the tube; anthers ovate with cordate bases, connective often produced beyond the apex of the parallel cells. *Ovary* 2-celled; styles 2, connate, separating from the base upwards, finally divergent; stigma capitate or two-lobed; ovules many in each cell, on peltate placentas. *Capsule* subglobose, laterally subcompressed, truncate, or somewhat 2-horned, dehiscent by the separation from above downwards of the carpels from the septum on each side. *Seeds* numerous, minute, subglobose; testa smooth, reticulated; albumen fleshy; embryo straight.—DISTRIB. 28 species, in Eastern Asia, New Zealand, Australia.

MITRASACME POLYMORPHA, R. Br. Prod. Nov. Holl. I. 452 (1810). An erect annual herb, 3 to 9 in. high, often with a long erect branch from the uppermost leaf-axil. *Stem* slender, glabrous except for a few slender hairs in the leafy part. *Leaves* sessile, oblong, blunt, confined to the lower inch or two of the stem, glabrous, .2 to .3 in. long, and about .05 in. broad. *Umbels* terminal, or at the ends of the scanty branches, few-flowered, very lax; pedicels much longer than the flowers, slender, unequal, glabrous. *Flowers* .15 in. long. *Calyx* with 4 spreading, triangular, acute lobes. *Corolla* twice as long as the calyx; throat hairy. *Capsule* subglobular, glabrous, about .1 in. across. A. DC. Prodr. IX. 10; Benth. Fl. Austral. IV. 353; Solereder in Engl. & Prantl Naturl. Pflanzenfam. IV. 2, 35, Fig. 18A-C. *M. capillaris*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 420, and Cat. 4348; Don Prodr.

Fl. Nep. 129; A. DC. *l. c.* 11; Benth. in Journ. Linn. Soc. I. 92; Miq. Fl. Ind. Bat. II. 362. *M. trinervis*, Spanoghe in Linnæa XV. 335 (1841); A. DC. *l. c.* 560. *M. malaccensis*, Wight. Ic. 1601. *Linnophila campanuloides*, Benth. in Wall. Cat. 3908.

MALACCA: *Goodenough* 669. — **DISTRIB.** Northern and Central India, Burma, Malay Archipelago, China, Australia.

### 3. BUDDLEIA, Linn.

Trees, shrubs, or herbs. *Leaves* opposite, entire or crenate, united by a stipular line. *Cymes* in dense globose or corymbiform cymes, axillary or in a terminal thyrsoid panicle. *Calyx* campanulate, 4-merous. *Corolla* urn-shaped; lobes 4, imbricate in bud. *Stamens* 4, adnate to the corolla-tube; anthers subsessile, ovate or oblong, with cordate or 2-lobed bases; cells parallel. *Ovary* 2-celled; style linear, clavate; ovules numerous in each cell; stigma terminal or decurrent on two sides. *Fruit* a septicidally 2-valved capsule; the valves entire or bifid. *Seeds* many, oblong or fusiform; testa usually lax, or expanded into a wing or tail; albumen fleshy; embryo straight.—**DISTRIB.** About 100 species; tropical and subtropical regions of the Old World.

Under surfaces of leaves, young branches, and inflorescence

with minute yellowish pubescence .. .. 1. *B. asiatica*.

Under surfaces of leaves, young branches, and inflorescence

densely rusty-tomentose .. .. 2. *B. madagascariensis*.

1. BUDDLEIA ASIATICA, Lour. Fl. Cochinch. 72 (1790). A shrub, 3 to 6 ft. high (sometimes as much as 15 ft.); young branches thicker than a crowquill, covered, like the branches of the inflorescence, with a subdeciduous, minute yellowish pubescence. *Leaves* opposite, membranous; oblong-lanceolate, the apex much acuminate, the base usually much narrowed; edges entire or with minute distant teeth; upper surface dark when dry, glabrous except the puberulous depressed midrib; lower surface pale yellowish-brown, minutely pubescent; main nerves 5 to 7 pairs, curving abruptly upwards and interarching rather far from the edge, thin but prominent like the midrib on the lower surface, obscure on the upper; length 2·5 to 6 in., breadth ·6 to 1·5 in.; petiole ·1 to ·35 in. long. *Inflorescence* terminal, consisting of numerous 3-flowered sessile cymules, arranged in spikes to form a few-branched lax panicle, 5 to 9 in. long. *Flowers* ·15 in. long, on very short pedicels. *Calyx* half as long as the corolla, pubescent externally; lobes erect, acuminate. *Corolla* glaberrulous, lobes blunt. *Ovary* narrowly oblong, tapering to the apex; stigma large, capitate, corrugated. *Capsule* ·2 in. long. Benth. in DC. Prodr. X. 446; Bot. Mag. t. 6323; Brandis For. Fl. 318; Kurz For. Fl. II. 250; Miq. Fl. Ind. Bat.

II. 363; Clarke in Hook. f. Fl. Br. Ind. IV. 82. *B. Neemda*, Ham. in Wall. Cat. 6401; Roxb. Fl. Ind. ed. Carey and Wall. I. 411; Reichenb. Ic. Bot. Exot. 21. *B. discolor*, Roth Nov. Spec. 83; Wight Ill. 165B, and Ic. 894. *B. salicina*, Lamk. Ill. I. 291. *B. acuminatissima*, Blume Bijdr. 743. *B. subserrata*, Don Prodr. Fl. Nep. 92. *B. virgata*, Blanco Fl. Filip. 57. *B. serratula*, Roth l. c. 82.

In all the Provinces; common.

2. *BUDDLEIA MADAGASCARIENSIS*, Lamk. Encyc. I. 513 (1783). A slender creeper, 60 to 80 ft. long; young branches half as thick as a crow-quill, covered, like the under surfaces of the leaves the inflorescence and the outer surface of the calyx, with dense pale brown tomentum. *Leaves* coriaceous; elliptic-lanceolate, the apex shortly acuminate, the base cuneate; upper surface very dark when dry, glabrous, reticulate; main nerves about 8 pairs, spreading, slightly prominent on the lower surface and depressed on the upper; length 2 to 3·5 in.; breadth ·6 to 1 in.; petiole ·3 to ·5 in. *Inflorescence* a terminal, often leafy, thyrsoid panicle, 8 to 12 in. long, with numerous diverging branches from 1 to 2 in. long (shorter near the apex), bearing pedunculate few-flowered umbellate cymules; bracteoles at base of branches linear, about ·5 in. long. *Flowers* orange, ·4 in. long, sessile, on very short pedicels. *Calyx* obovoid-ellipsoid; teeth short, blunt; tube glabrous within. *Corolla* salver-shaped; lobes of the limb blunt, short, reflexed, glabrescent; tube cylindric, ·35 in. long, cottony without, sparsely hairy inside like the narrowly oblong ovary. *Anthers* sessile near the mouth of the corolla-tube. *Capsule* globular, ·35 in. in diam.; pericarp thick, scaly, dark-coloured. Lamk. Ill I. t. 69, fig. 3; Benth. in DC. Prodr. X. 447; Bot. Mag. 2824.

PENANG: *Hullett* 121; *Murton* 4; *Ridley* 7049; *King's Collector* 1340. PERAK: *King's Collector* 5201; MALACCA: *Maingay* (K.D.) 1033/2; *Wallich* 6402. A native of Madagascar, but in some spots within our area almost naturalised.

#### 4. *NORRISIA*, Gardn.

A shrub; the young parts pubescent. *Leaves* opposite; petioles dilated at the base and subconnate. *Flowers* small, yellow. *Calyx* small, 5-lobed. *Corolla* with narrow cylindric tube; the limb with 5 small, ovate, valvate lobes. *Stamens* 5, inserted on the corolla-throat; filaments slender; anthers ovate. *Ovary* 2-celled; style filiform; stigma capitate; ovules numerous in each cell. *Capsule* oblong, septically 2-valved, carpophore finally free. *Seeds* numerous; testa lax, 4 to 6 times as long as the linear caudate nucleus; albumen fleshy; embryo straight or curved.—DISTRIB. Two species; both Malayan.

Flowers .25 in. long; capsules .15 in. long	..	..	1. <i>N. malaccensis</i> .
Flowers .35 in. long; capsules .25 in. long	..	..	2. <i>N. major</i> .

1. *NORRISIA MALACCENSIS*, Gardn. in Hook. Kew Journ. I. 327 (*in part*) (1849). A tree; young branches much thinner than a goosequill, terete, deciduously fulvous-puberulous and with many lenticels, dark brown when dry. *Leaves* thinly coriaceous; ovate or elliptic, acute at each end; upper surface brown, glabrous, shining; the lower rather pale olivaceous, glabrous except the deciduously puberulous midrib and nerves (uniformly puberulous in var.); main nerves 4 to 6 pairs, ascending, curved, prominent like the midrib on the lower surface, indistinct on the upper; length 1.5 to 2.5 in., breadth .85 to 1.25 in.; petiole .25 in. *Cymes* as in *N. major*, but smaller, and the flowers only .25 in. long, and the ripe capsules rather less than .15 in. long. Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*).

MALACCA: *Griffith* (K.D.) 3731 (*in part*); *Maingay* (K.D.) 1023; *Goodenough* 1382; *Derry* 1035.

VAR. *pubescens*, King & Gamble. Under surfaces of leaves uniformly pubescent.

PERAK: *Scortechini* 634; *King's Collector* 10535.

2. *NORRISIA MAJOR*, Solereder in Engl. & Prantl. Naturl. Pflanzenfam. IV. 2, 37 (1892). A tree; young branches thinner than a goosequill, terete, deciduously fulvous-puberulous, black when dry. *Leaves* thinly coriaceous; elliptic or oblong-elliptic, acute, the base cuneate; both surfaces olivaceous-brown when dry, the lower reticulate, both glabrous except the fulvous-puberulous midrib and nerves on the inner surface; main nerves 5 to 7 pairs, stout, oblique, little-curved, deciduously fulvous-puberulous like the midrib on the lower surface; length 2.75 to 3.25 in., breadth 1.5 to .25 in.; petiole .2 to .25 in. long. *Cymes* in dense, corymbose, terminal, pedunculate panicles, their branches fulvous-tomentose; bracts linear, about .2 in. long or less. *Flowers* sessile or subsessile, minutely bracteolate, .35 in. long. *Calyx* minute, cupular, 5-toothed. *Corolla* with a cylindric tube slightly dilated near the base, densely pubescent outside; the mouth with 5 linear-oblong, blunt, much recurved lobes, glabrous inside; filaments much exerted; anthers broadly ovate. *Capsule* .25 in. long and about .15 in. in diam., ellipsoid, pubescent. *Seeds* with a much elongate wing at each end. *N. malaccensis*, Gardn. in Hook. Kew Journ. Bot. I. 327; Clarke in Hook. f. Fl. Br. Ind. IV. 85 (*in part*). *Antonia Griffithii*, Wight Ill. II. t. 156B.

PERAK: *King's Collector* 7845, 10882. MALACCA: *Griffith*; *Maingay* (K.D.) 1024; *Ridley* 1382. SINGAPORE: *Ridley* 6828.

5. FAGRÆA, Thunb.

Trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, entire (crenulate in *F. crenulata*); petioles dilated at the base or united by a stipular sheath. *Cymes* terminal or axillary, corymbose racemose or paniculate; bracts small. *Flowers* large or small, white or yellowish, rarely pink. *Calyx* deeply 5-fid; its lobes thick, broad, much imbricate. *Corolla-tube* narrow or funnel-shaped, sometimes much elongate; lobes of its limb broad, twisted to the left in bud. *Stamens* 5; anthers oblong, on slender filaments. *Ovary* 2-celled, or 1-celled above; style filiform; stigma capitate; ovules numerous in each cell. *Berry* 1- to 2-celled. *Seeds* numerous, immersed in pulp; testa crustaceous; albumen horny; embryo small, straight.—*DISTRIB.* About 50 species, in India, China, Japan, Malaya, Australia and the Pacific Islands.

Cymes few-flowered, solitary, sessile or nearly so :—

Flowers 3 to 6 in. long :—

Corolla salver-shaped, its tube narrowly cylindric, very little dilated at the throat :—

Tube of corolla nearly 3 in. long and only about .1 in. in diam.; limb less than 1 in. across .. .. 1. *F. tubulosa*.

Tube of corolla 4 in. long and .35 in. in diam.; limb more than 2 in. across .. .. 2. *F. carnosa*.

Corolla funnel-shaped from near the base :—

Corolla 5 or 6 in. long .. .. 3. *F. auriculata*.

Corolla 3.5 in. long .. .. 4. *F. Curtisii*.

Flowers 1.25 to 2.5 in. long :—

Limb of corolla 1.5 in. across; stamens only slightly exerted :—

Corolla-lobes oblong, blunt; fruit elliptic-ovoid; leaves 3.5 to 5 in. long and 1.5 to 2.25 in. broad .. .. 5. *F. obovata*.

Corolla-lobes rotund-oblong; fruit globose, crowned by the remains of a stout style; leaves 2.5 to 4.5 in. long and 1 to 1.75 in. broad .. .. 6. *F. lanceolata*.

Limb of corolla about .75 in. across; stamens much exerted .. .. 7. *F. Wallichiana*.

Cymes few-flowered but numerous, arranged in long, usually pedunculate, sometimes interrupted, terminal racemes :—

Flowers 2 in. long; corolla widely funnel-shaped; its limb 1.5 in. across .. .. 8. *F. Maingayi*.

Flowers 1 to 1.25 in. long; corolla widely funnel-shaped; the limb .75 to .9 in. across .. .. 9. *F. racemosa*.

Cyme solitary, on the apex of a short, slender, terminal or axillary peduncle; flowers 1.15 in. long; corolla narrowly funnel-shaped; its limb about .75 in. across .. .. 10. *F. ligustrina*.

Cymes spreading, corymbose, many-flowered :—

Flowers 1.5 to 2 in. long; stamens slightly exerted :—

Leaves crenulate, 7 to 12 in. long; flowers 1.5 in. long .. 11. *F. crenulata*.

Leaves entire, 5 to 9 in. long; flowers 2 in. long .. 12. *F. vaginata*.

Flowers .5 in. long; stamens much exerted .. .. 13. *F. fragrans*.

## SPECIES IMPERFECTLY KNOWN.

Leaves broadly obovate, very coriaceous; fruit 2 in. or more in length, ovoid, apiculate .. .. 14. *F. Ridleyi*.

Leaves elliptic-oblong, thin when dry; fruit narrowly ovoid, tapered to the base, crowned by the remains of the thick style .. .. 15. *F. oblonga*.

1. *FAGRÆA TUBULOSA*, Blume Mus. Bot. Lugd.-Bat. I. 167 (1850). A straggling, glabrous, climbing shrub; branches half as thick as a goose-quill, terete, pale, sending out rootlets at intervals on the bark of trees. *Leaves* thinly coriaceous; oblong-elliptic, shortly abruptly acuminate, the base cuneate; both surfaces pale yellowish-green, and dull when dry; main nerves 5 or 6 pairs, inconspicuous on both surfaces; midrib conspicuous; length 4 to 8 in., breadth 1·75 to 2·5 in.; petiole ·8 to 1 in. long. *Flowers* about 3 in. long, sessile, 3 or 4 crowded in a sessile glomerulus at the apex of a branch, with a subcampanulate bract, ·15 in. long, at the base of each. *Calyx* ·4 in. long, fleshy, tubular; the mouth with 5 short, broad, imbricate teeth. *Corolla* 3 in. long, salver-shaped; the tube slender, cylindric, very slightly wider at the throat, ·1 in. in diam.; limb divided to its base into 5 oblong-oblongeolate lobes ·45 in. long. *Stamens* attached near the mouth of the tube and slightly exerted beyond it. *Ovary* narrowly ellipsoid, tapering into a glabrous style about as long as the corolla; stigma capitate. *Fruit* unknown. Miq. Fl. Ind. Bat. II. 373.

PERAK: *Scortechini* 1839; *King's Collector* 5748; at Bujong Malacca, *Ridley* 9738.—DISTRIB. Bangka, Sumatra.

2. *FAGRÆA CARNOSA*, Jack in Mal. Misc. II. n. 7, 81 (1822). Epiphytal, glabrous; young branches as thick as a swan's quill, smooth, pale brown when dry. *Leaves* coriaceous; elliptic, sometimes subobovate or subrotund, the apex rounded or subtruncate, mucronate; edges recurved; upper surface when dry somewhat olivaceous, the lower dull brown; main nerves invisible on either surface; midrib prominent on the lower, depressed on the upper surface; length 3 to 4·5 in.; breadth 2 to 2·5 in.; petiole ·4 to ·5 in. long, swollen at the base. *Flowers* fleshy, about 6 in. long, solitary or in pairs, terminal, with 2 or more short, woody, pointed bracteoles at their bases, sessile or subsessile. *Calyx* narrowly campanulate, nearly 1 in. long; its tube very short; the limb with 5 oblong, blunt, suberect lobes. *Corolla-tube* 4 in. long, cylindric, ·35 in. in diam. at the middle, slightly wider towards the mouth; limb campanulate, about 1·25 in. across, with 5 broadly oblong, blunt, spreading lobes. *Stamens* subsessile near the apex of the tube, included. *Style* slightly longer than the tube. *Fruit* the size of a small hen's egg, but narrower and more tapering to the apex. DC. Prodr. IX. 30; Benth. in Journ.

Linn. Soc. IX. 97; Miq. Fl. Ind. Bat. II. 374; Clarke in Hook. f. Fl. Br. Ind. IV. 82.

PERAK: *Scortechini*; Wray 2317; King's Collector 5349, 7296, 8452; Ridley 10297.—DISTRIB. Burma.

3. *FAGRÆA AURICULATA*, Jack in Mal. Misc. II. n. 7, 82 (1822). A glabrous shrub; young branches about .5 in. in diam., pale. *Leaves* thickly coriaceous; oblong-ob lanceolate or -obovate; apex subacute or acute, narrowed from about the middle to the stout petiole; both surfaces pale yellowish-brown when dry; main nerves 6 to 8 pairs, spreading, slightly curved, rather conspicuous on the lower surface, invisible on the upper; midrib broad, bold on both surfaces; length 6 to 12 in.; breadth 2.35 to 4 in.; petiole .5 to 1.25 in. long, with 2 rotund, reflexed, stipule-like auricles at the base, .5 to .75 in. across. *Flowers* thickly coriaceous in all their parts, 5 or 6 in. long, in terminal cymes of about 3; their pedicels about as thick as a goosequill, minutely adpressed, pubescent, .75 to 1.5 in. long, and bearing near the base of the flower one or two pairs of triangular, one-ribbed, appressed, large bracteoles. *Calyx* ellipsoid, nearly 2 in. long, deeply divided into 5 imbricate elliptic or oblong blunt lobes. *Corolla* with a cylindric tube about 1 in. long and .5 in. in diam. (when dry); the limb funnel-shaped, 3 to 4 in. long, with 5 deep, oblong, blunt lobes. *Stamens* 5, included; the filaments attached to the base of the limb by thickened bases; anthers .65 in. long, oblong, deeply bifid at the base the filaments attached by their attenuate apices at the upper end of the notch. *Ovary* narrowly ellipsoid, glabrous; style stout, 4 in. long; stigma peltate. *Fruit* narrowly ellipsoid, blunt, glabrous, 2.25 in. or more in length when dry. Wall. Cat. 1596; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 34 and 573; Pl. As. Rar. III. 15, t. 229; Blume Bijdr. 1020, and Rumph. II. t. 72; DC. Prodr. IX. 29; Miq. Fl. Ind. Bat. II. 371; Clarke in Hook. f. Fl. Br. Ind. IV. 83. *F. auricularia*, Benth. in Journ. Linn. Soc. I. 98; Kurz For. Fl. II. 204. *F. imperialis*, Miq. in Ann. Mus. Bot. Lugd.-Bat. II. 226, t. 5. *Willughbeia auriculata*, Spreng. Syst. curæ post. 71.

Common in all the Provinces.—DISTRIB. Malay Archipelago.

4. *FAGRÆA CURTISII*, King & Gamble, n. sp. A low spreading tree; young branches as thick as a swan's quill, grey, striate when dry. *Leaves* very coriaceous; elliptic or slightly obovate, the apex shortly and bluntly acuminate, the base cuneate; both surfaces glabrous, olivaceous when dry; the midrib prominent on the lower surface, faint on the upper, nerves obsolete in both; length 4 to 8.5 in., breadth 2.25 to 3 in.; petiole .5 to .75 in. long, stout, sheathing at the base. *Flowers* 3.5 in. long, terminal, in pairs; their pedicels stout, compressed, about .5 in. long, bearing

2 pairs of broadly ovate, acute, fleshy bracteoles. *Calyx* .7 to .9 in. long, very coriaceous, narrowly campanulate, cut one-third of the way down into 5 rounded lobes. *Corolla* thickly coriaceous, 3.25 in. long, funnel-shaped; tube 1.75 in. long, much widened towards the mouth; limb spreading, with 5 deep broadly elliptic lobes, with obtusely, minutely, and bluntly apiculate apices. *Stamens* slightly exserted; anthers oblong, blunt. *Fruit* unknown.

KEDAH: in Langkawi Island, *Curtis* 1676.

5. *FAGRÆA OBOVATA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II., 33 (1824). Scandent, glabrous, epiphytic; young branches nearly as thick as a goosequill, brown when dry. *Leaves* coriaceous; oblong-oblancheolate to elliptic sometimes obovate, the apex abruptly and shortly acuminate or mucronate, the base cuneate; both surfaces brown when dry, the upper tinged olivaceous; main nerves almost invisible; midrib very prominent on the lower surface, less so on the upper; length 3.5 (rarely 2.5 in.) to 5 in., breadth 1.5 to 2.25 in. (rarely only 1 in.); petiole .6 to 1 in. long, swollen at the base. *Flowers* 2 to 2.25 in. long, sessile or on peduncles .3 in. long, in small terminal sessile cymes of 4 or 5; the cymes with 2 thick oblong bracts at their bases. *Calyx* .5 to .75 in. long, .4 in. wide, tubular with 2 thick triangular bracteoles at the base; lobes of limb ovate-elliptic or subrotund, obtuse. *Corolla* funnel-shaped, 1.8 to 2.15 in. long; the tube .75 in. long, narrowly cylindric below, wider upwards; limb 1.5 in. wide, deeply cut into 5 oblong, blunt, spreading lobes; filaments slender, attached near the apex of the tube, shorter than the corolla-lobes; anthers included, oblong, deeply cleft at the base. *Ovary* elliptic; style slightly shorter than the anthers; stigma capitate. *Fruit* elliptic-ovoid, smooth, shining, crowned by the short remains of the style, 1.5 in. long. Wall. Cat. 1595; Blume Bijdr. 1021, and Rumph. II. t. 75; DC. Prodr. IX. 29; Bot. Mag. t. 4205; Griff. Notul. IV. 35, and Ic. Pl. Ind. Or. t. 382; Miq. Fl. Ind. Bat. II. 369; Clarke in Hook. f. Fl. Br. Ind. IV. 83; Kurz For. Fl. II. 205. *F. crassifolia*, Blume Rumph. II. 78, fig. 1, and Mus. Bot. Lugd.-Bat. I. 166; Thwaites Enum. 200; Miq. l.c. 373; Wall. Cat. 1602. *F. malabarica* and *F. obovato-javana*, Blume Rumph. II. 29, t. 75, and Mus. Bot. l. c. 164; Wight Ic. 1317. *F. Blumei*, Steud.; DC. l.c. 30. *F. coromandeliana*, Wight Ic. 1316; Bedd. Fl. Sylv. t. 224. *F. celebica*, Blume Mus. Bot. l. c. 167. *F. globosa*, Wall. Cat. 1598; DC. l. c. 29. *Willughbeia obovata*, Spreng. Syst. curæ post. 71.

KEDAH: *Curtis*. PENANG: *Curtis* 246, 2432, 3013. PERAK: *Wray* 1139, 2115, 2248, 2426, 2714, 3075, 4181, 4269; *Scortechini* 202, 758; *King's Collector* 3122, 4024, 4878, 5748, 6214, 6438, 7553, 7578, 8855, 10109, 10634, 10776. MALACCA: *Griffith* (K.D.) 3737; *Maingay* (K.D.)



1028, 1030, 1031; Derry 1012. JOHORE: Ridley 6312—DISTRIB. Malay Archipelago, British India.

Following Mr. Clarke in Hooker's 'Flora of British India,' we have reduced to *F. obovata*, Wall., not only the forms which have received specific names as above quoted, but also those found in British India, there being no constant characters that we can discover to separate them. Some of the specimens from India have, however, longer flowers, and the main nerves of their leaves are more distinct than in the majority of Malayan specimens.

6. *FAGRÆA LANCEOLATA*, Blume Bijdr. 1021 (1826). Scandent, 30 to 40 ft. long, glabrous; young branches about as thick as a goosequill, the nodes close together, cinereous when dry. *Leaves* coriaceous; oblong-oblanceolate, subacute, the base much narrowed; both surfaces very dark cinereous when dry; main nerves invisible; midrib bold on the lower surface, faint on the upper; length 2·5 to 4·5 in., breadth 1 to 1·75 in.; petiole ·35 to ·5 in. long. *Flowers* terminal, pedunculate, solitary or in pairs or in threes; their peduncles subclavate, about 3 in. long, hibracteolate at the apex, and sometimes with larger bracts at the base. *Calyx* 5 in. long, obconic, 5-lobed; the lobes coriaceous, fleshy below, rounded, with membranous margins. *Corolla* 3 in. long, funnel-shaped, the lobes of the limb spreading, oblong-rotund. *Stamens* 5, exserted. *Anthers* oblong, obtuse, dorsifixed; filaments slender. *Ovary* ovoid; style filiform. *Fruit* obovoid, globose, smooth, shining, nearly 1·5 in. in diam., crowned by a short stout fragment of the style; the calyx at its base with 5 subrotund lobes ·45 in. broad and with broad scarious edges. Blume Rumph. II. 31, t. 77, and Mus. Bot. Lugd.-Bat. I. 167; Miq. Fl. Ind. Bat. II. 376.

PERAK: Wray 3202; King's Collector 6848.—DISTRIB. Java.

7. *FAGRÆA WALLICHIANA*, Benth. in Journ. Linn. Soc. I. 98 (1857). A tree?; young branches half as thick as a goosequill, pale brown when dry, glabrous; the leaf-scars close together and prominent. *Leaves* coriaceous; narrowly elliptic or oblanceolate, apex acute or shortly acuminate, the base much narrowed and forming narrow wings to the petiole; both surfaces glabrous, the upper greenish when dry, the lower brown; main nerves 4 or 5 pairs, curving upwards and forming wide arches ·1 to ·15 in. from the edge, rather distinct on the lower surface when dry, invisible on the upper; midrib conspicuous on the lower surface; length 2·25 to 3 in., breadth ·6 to 1·1 in.; petiole ·3 to ·5 in. long, winged in its upper part. *Flowers* (excluding the stamens) 1 to 1·25 in. long, pedicellate, 3 to 5 together in pedunculate lax cymes from the apex and upper leaf-axils; bracteoles few, minute; peduncles about 1 in. long; pedicels about ·5 in. *Calyx* clavate, about 5 in. long; the teeth 5, minute. *Corolla* salver-shaped, 1 in. long; the tube cylindric, slender, becoming

wider towards the campanulate limb; limb .65 in. in diam., its 5 lobes oblong, obtuse, spreading. *Stamens* 5, their slender filaments inserted near the apex of the tube and exserted .75 in. beyond its lobes. *Anthers* (ovate?). *Ovary* narrowly ellipsoid, tapering to the filiform long-exserted style 2 to 2.5 in. long; stigma narrow. *Fruit* ellipsoid, slightly tapered each end, shining, .5 in. long. *F. lanceolata*, Wall. Cat. 1599 (not of Blume); Clarke in Hook. f. Fl. Br. Ind. IV. 85. *Cyrtophyllum ? lanceolatum*, DC. Prodr. IX. 31.

PENANG: *Curtis* 375. PERAK: *King's Collector* 4851. MALACCA: *Maingay* (K.D.) 1029.

8. *FAGRÆA MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. IV. 84 (1883). A glabrous tree, 40 to 50 ft. high; young branches as thick as a swan's quill. *Leaves* large, very coriaceous; oblong to elliptic-oblong, blunt, obtusely apiculate, the base rounded, the edges when dry recurved; upper surface pale or brownish-olivaceous, the lower brown when dry, both dull; main nerves 5 to 8 pairs, stout but faint on both surfaces; midrib stout on the lower surface, faint on the upper; length 7 to 10 in., breadth 2.75 to 4 in.; petiole .5 to .9 in. long, stout, slightly dilated at the base. *Cymes* few-flowered, subsessile, mixed with some solitary flowers in a terminal, elongate, pedunculate raceme, with a rachis as thick as a goose-quill and 3 to 6 in. long; its peduncle 2 to 3 in. long. *Flowers* 2 in. long, solitary or in shortly pedunculate cymes of 2 or 3; pedicels .5 in. long, with 2 pairs of broadly ovate-acute bracteoles at their bases. *Calyx* subglobular or ellipsoid, about .5 in. long, cleft nearly to the base into 5 rotund-ovate lobes with scarious margins. *Corolla* funnel-shaped, 1.75 in. long; the tube .2 in. in diam. at the base, but gradually expanding upwards; the limb 1.5 in. wide, its lobes 5, broad, blunt. *Stamens* 5, included. *Ovary* narrowly ellipsoid, much attenuate upwards; style slender; stigma turbinate, lobed, included. *Fruit* unknown.

PERAK: *King's Collector* 8671. MALACCA: *Maingay* (K.D.) 1033; *Derry* 573.

9. *FAGRÆA RACEMOSA*, Jack in Roxb. Fl. Ind. ed. Carey & Wall. II. 35 (1824). A glabrous bush or small tree, 12 to 25 ft. high; young branches from half as thick to as thick as a goosequill, pale when dry, and sometimes angled. *Leaves* large, coriaceous; elliptic or oblong-elliptic to elliptic-rotund, apex blunt but terminated by a short abrupt acute apiculus less than .5 in. long, base cuneate or rounded; both surfaces yellowish-olivaceous when dry, the lower paler; main nerves 5 to 7 pairs, spreading, curving upwards and interarching, .1 to .25 in. from the edge; midrib very prominent on the lower surface, less so on the upper; length 5 to 10 in., breadth 3 to 6 in.; petiole .4 to .8 in. long expanded at

the base. *Flowers* fleshy, 1 to 1.25 in. long, on thick pedicels arranged in small sessile cymelets crowded in a terminal, pedunculate, sometimes interrupted, raceme, from 1.5 to 6 in. long; peduncle of the raceme 1.5 to 4 in. long; pedicels of the individual flowers .2 to .25 in. long, bearing at their bases several broad, short, bracteoles. *Calyx* obovoid, .25 to .35 in. long, cleft half-way into 5 broad subrotund lobes. *Corolla* .85 in. to 1 in. long, widely funnel-shaped; the limb .75 to .9 in. across, divided into 5 blunt oblong spreading lobes .25 in. long; tube only .2 to .3 in. long, abruptly expanding at the throat. *Stamens* 5, included; the filaments slender. *Anthers* broadly elliptic, marginate, deeply cleft at the base. *Ovary* narrowly elliptic; style much thicker than and about as long as the filaments; stigma capitate. *Fruit* ellipsoid, smooth, .5 in. long. DC. Prodr. IX. 29; Benth. in Journ. Linn. Soc. I. 99; Kurz For. Fl. II. 205; Benth. Fl. Austral. IV. 367; Clarke in Hook. f. Fl. Br. Ind. IV. 84. *F. coarctata*, Blume Rumph. II. 33, and Mus. Bot. Lugd.-Bat. I. 170. *F. volubilis*, Jack in Roxb. l.c. 36; DC. l.c. 30; Miq. Fl. Ind. Bat. II. 367. *F. morindæfolia*, Blume Rumph. II. 32, t. 73, fig. 2, and t. 79, and Mus. Bot. l.c. 169; DC. l.c. 29; Clarke l.c. *F. appendiculata*, *F. cuspidata*, *F. robusta*, Blume Mus. Bot. l.c. 169, 170. *F. Thwaitesii*, F. Muell. Fragm. Phyt. Austral. II. 137. *Kuhlia morindæfolia*, Reinw. in Blume Bijdr. 777. *Kentia morindæfolia*, Steud. Nomencl. Bot. ed. 2, I. 845. *Utania morindæfolia*, G. Don Gen. Hist. Dichl. Pl. IV. 663. *Willughbeia racemosa*, Spreng. Syst. curæ post. 71.

In all the provinces: very common.—DISTRIB. Malayan Archipelago, Burma.

**VAR. pauciflora**, King & Gamble. *Leaves* thinly coriaceous; raceme lax, its rachis slender. *Flowers* solitary or in 2- to 3-flowered cymes, not crowded.

PERAK: Wray 1960; King's Collector 707, 1926, 3016, 3242; Scortechini 112. SINGAPORE: Ridley 6315, 8917.—DISTRIB. Sumatra (Forbes 1927), Java.

10. *FAGRÆA LIGUSTRINA*, Blume Rumph. II. 33 (1836). A shrub, all parts glabrous; young branches twice as thick as a crowquill, terete, pale yellowish-brown when dry. *Leaves* coriaceous; elliptic to elliptic-oblong, apex shortly and rather bluntly acuminate, base cuneate; both surfaces pale yellowish-brown when dry; main nerves about 4 pairs, spreading at first, then ascending to form wide arches .15 to .2 in. from the edge, slightly conspicuous on the lower surface, very faint on the upper; midrib stout on the lower surface, slightly channelled on the upper; length 3 to 3.75 in., breadth 1 to 2 in.; petiole .25 to 3 in. long. *Flowers* 1.15 in. long, on thick pedicels less than .1 in. long, 5 to 10 together in simple or shortly branched terminal or axillary

pedunculate cymes. *Calyx* fleshy, .15 in. long, pyriform; the mouth with 5 shallow very broad imbricate lobes faintly ciliate at the apex. *Corolla* slightly exceeding 1 in. in length; the tube narrowly cylindric below, expanding upwards into the narrowly campanulate broadly 5-lobed limb .75 in. wide. *Stamens* 5, slightly exserted; filaments inserted at the base of the limb, broad, membranous at the edges. *Anthers* narrowly oblong, blunt, the base deeply auriculate. *Ovary* narrowly ellipsoid, tapering into a style as long as the stamens; stigma narrow. *Fruit* clavate, apiculate, smooth, .6 in. long (unripe). Blume Mus. Bot. Lugd.-Bat. I. 171; Benth. in Journ. Linn. Soc. I. 100; Clarke in Hook. f. Fl. Br. Ind. IV. 85.

SINGAPORE: *Ridley* 1650, 2783, 8453; *Lobb*.

11. *FAGRÆA CRENULATA*, Maing. ex Clarke in Hook. f. Fl. Br. Ind. IV. 83 (1883). A tree (or a climber?), all parts glabrous; young branches .75 in. thick, the older with prominent leaf-scars close together, yellowish-brown. *Leaves* coriaceous; broadly obovate-rotund, with no petiole, but abruptly narrowed above the base and embracing the branch; both surfaces dark brown when dry; the edges minutely crenate; main nerves 4 or 5 pairs, spreading, prominent on the lower surface, slightly depressed on the upper; length 7 to 12 in., breadth 5.5 to 8 in. at the broadest part, but 1 in. or less at the contracted part above the attachment to the branch. *Flowers* coriaceous, 1.5 in. long, on short thick pedicels or sessile, arranged in terminal pedunculate compound trichotomous cymes with divaricating 4-angled branches; peduncle of cyme compressed, 1 to 3 in. long, with 2 spreading thick concave bracts at its apex. *Calyx* .35 in. long, campanulate, cut half-way down into 5 unequal broad blunt suberect lobes. *Corolla* 1.25 in. long, clavate in bud, funnel-shaped; the tube narrowly cylindric, .2 in. long; the limb funnel-shaped, cut a quarter of its length into 5 blunt lobes. *Stamens* 5, included; filaments attached to the mouth of the tube; anthers oblong, deeply bifid at the base, the cells parallel. *Ovary* glabrous, ellipsoid-conic, tapering into the thin exserted style; stigma obconic. *Fruit* ellipsoid (unripe .75 in. long).

KLANG: *Ridley* 9552. PERAK: *Scortechini* 1642. MALACCA: *Main-gay* (K.D.) 1032; *Ridley* 1284. SELANGOR: *Ridley* 7552.

12. *FAGRÆA VAGINATA*, King & Gamble, n. sp. A large glabrous shrub or small tree, sometimes apparently a climber; young branches from .25 to .35 in. in diam., yellowish-cinereous when dry and somewhat 4-angled. *Leaves* thickly coriaceous; elliptic to obovate-elliptic, blunt or slightly apiculate, much narrowed at the base; upper surface olivaceous, the lower brown when dry; main nerves 5 or 6 pairs, curved, spreading, very prominent on the lower surface, faint on the upper;

midrib very stout on the lower surface, much more slender on the upper; length 5 to 9 in., breadth 2.75 to 4 in.; petiole about 1 in. long, expanding into a sheath at the base. *Flowers* 2 in. long, collected in lax terminal cymose corymbs, 4 in. long, and about as much in breadth; the branches 1.25 to 1.75 in. long, each bearing an umbellate 3-flowered cyme; lower bracts linear-oblong, blunt, 1 in. long, the upper only .15 in. long; pedicels about .5 in. long, bibracteolate at the apex. *Calyx* .8 or .9 in. long, narrowly tubular in its lower part, the upper much wider; the mouth with 5 broad, blunt, erect lobes, .2 in. long. *Corolla* 1.5 in. long; its tube .5 in. long; the limb widely funnel-shaped, with .5 broad, blunt, spreading lobes. *Stamens* 5; filaments attached to the mouth of the tube, shorter than the corolla-limb, attached to the oblong anthers at the apex of their deep basal notch; anthers .2 in. long. *Ovary* ovoid, apiculate; style much shorter than the corolla; stigma conical. *Fruit* ovoid-conic, crowned by the short style, glabrous, shining, 1.75 in. long.

PERAK: *Wray* 1084, 1992; *King's Collector* 3868, 4041, 4238, 6605, 10124; *Scortechini* 817. SELANGOR: *Ridley* 7607. — *DISTRIB.* Java, *Anderson* 289; *Forbes* 827.

Named from its sheathing petioles; allied to *F. obovata*, Wall.

13. FAGRÆA FRAGRANS, Roxb. Fl. Ind. ed. Carey & Wall. II. 32 (1824). A tree, 100 to 150 ft. high, all parts glabrous; young branches much thinner than a goose-quill, shining, yellowish-brown when dry, the nodes close together. *Leaves* thinly coriaceous, small; oblanceolate to elliptic, the apex shortly and abruptly acuminate, the base much narrowed; the edges (when dry) slightly waved and recurved; both surfaces olivaceous-brown when dry, the lower the darker, subglandular; main nerves 5 to 8 pairs, subhorizontal, faint on both surfaces; midrib prominent on both, but especially on the lower surface; length 2.25 to 4 in.; petiole .3 to .6 in. long. *Cymes* axillary or terminal, much branched, pedunculate, corymbose, 20- to 30-flowered. *Flowers* .5 in. long (excluding the much exerted stamens and style). *Calyx* under .1 in. length, campanulate, with 5 rounded lobes. *Corolla* salver-shaped, .5 in. long, its tube narrow; limb with 5 somewhat unequal, oblong, blunt, spreading lobes. *Stamens* exerted for more than .5 in.; anthers elliptic; filaments slender. *Ovary* ovoid, glabrous; style longer than the stamens. *Fruit* subglobose, reddish, .3 in. in diam. Roxb. Fl. Ind. I. 461; Wall. Cat. 1597; Miq. Fl. Ind. Bat. II. 375; Kurz For. Fl. II. 205; Clarke in Hook. f. Fl. Br. Ind. IV. 85. *F. peregrina*, Blume Rumph. II. t. 80; Field. and Gardn. Sert. t. 6. *Cyrtophyllum fragrans*, DC. Prodr. IX. 31. *C. peregrinum*, Reinw.; Blume Bijdr. 1022; DC. l. c.

PENANG: *Curtis* 314. PERAK: *Low* 130; *Scortechini* 993, 2045; *King's Collector* 6073, 6175. MALACCA: *Maingay* (K.D.) 1026; *Griffith* (K.D.) 3735; *Derry* 53, 272. SINGAPORE: *Schomburgk* 38; *Ridley* 8921; *G. King*.—DISTRIB. Malay Archipelago.

## SPECIES IMPERFECTLY KNOWN.

14. *FAGRÆA RIDLEYI*, King & Gamble, n. sp. Epiphytal, quite glabrous; young branches as thick or nearly twice as thick as a swan's quill, brown when dry. *Leaves* thickly coriaceous; obovate, the apex broad and rounded, much tapered to the base; both surfaces pale yellowish-brown when dry; main nerves 5 pairs, ascending, rather straight, very stout and prominent on the lower surface like the broad midrib; length 5 to 9 in., breadth 3·5 to 6 in.; petiole 1 to 1·5 in. long, very stout, expanded at the base. *Flowers* unknown. *Fruit* 2 in. or more in length and 1·25 in. in diam. (when dry), in terminal cymes, ovoid, apiculate, shining; the calyx at its base 1 in. long, campanulate, with 5 broad rotund lobes, coriaceous.

MALACCA: on Mount Ophir, *Ridley*, 3785. SINGAPORE: *Ridley* 2767, 5845, 11363.

15. *FAGRÆA OBLONGA*, King & Gamble, n. sp. A small tree (or epiphyte?); young branches about as thick as a goose-quill, the internodes short; when dry brownish and shining. *Leaves* thinly coriaceous; elliptic-oblong, the apex shortly and rather abruptly acuminate, the base cuneate; edge slightly reflexed; both surfaces shining when dry, pale, the upper olivaceous, the lower tinged with yellow; midrib prominent on both, but especially on the lower surface; main nerves invisible; length 5 to 11 in., breadth 1·75 to 2·75 in.; petiole ·75 to 1·5 in. long. *Flowers* unknown. *Fruit* narrowly ovoid, tapered to the base, shining, crowned by the remains of the thick style, 2 in. long and about 1·25 in. in diam.

PERAK: at elevations of about 3500 ft., *Scortechini*; *King's Collector* 5430, 8445; *Wray* 2992; *Ridley* 5558.

6. *STRYCHNOS*, Linn.

Trees or scandent shrubs, usually with short, axillary, clavate tendrils. *Leaves* opposite, with 3 to 5 or more ribs starting at or a little above the base; other nerves less conspicuous. *Flowers* usually white or yellowish, in terminal or axillary, usually corymbosely panicle, cymes; bracts and bracteoles small. *Calyx* small, 5- or 4-partite. *Corolla* hypocrateriform or campanulate; lobes 5 or 4, valvate. *Stamens* 5 or 4, inserted at the throat of the corolla-tube or below it; filaments short, filiform; anthers ovate or oblong, with distinct parallel cells.

*Ovary* 2-celled (or 1-celled in the upper part); ovules many in each cell; style long or short; stigma capitate or obscurely 2-lobed. *Fruit* a berry, usually globose, indehiscent, with a hardened pericarp. *Seeds* many, or by abortion 1 to 2 only, immersed in pulp, variously compressed, or if solitary globose; the hilum ventral; albumen usually copious, generally horny; embryo short, with flattened, foliaceous cotyledons and short terete radicle.—**DISTRIB.** Tropical and subtropical regions of both hemispheres; species about 100.

In describing the characteristic leaves of this genus, we have distinguished between the prominent “ribs” and the less conspicuous “nerves.”

Corolla-tube shorter than the lobes; berry usually small; seeds very few:—

Corolla-tube scarcely any, at most .025 in. long, tawny-villous within; leaves elliptic .. .. . 1. *S. Maingayi*.

Corolla-tube about .05 to .1 in. long:—

Corolla-lobes about .15 to .2 in.; stamens glabrous, inserted at the top of the tube; leaves ovate .. .. . 2. *S. Curtisi*.

Corolla-lobes about .075 in.; stamens villous, inserted at the middle of the tube; leaves elliptic-ovate or -oblong .. .. . 3. *S. laurina*.

Corolla-tube equal to or nearly equal to the lobes; berry small; seeds few:—

Corolla-tube and lobes together less than .125 in. long; leaves chartaceous; ovary rounded, glabrous:—

Corolla-tube and lobes glabrous on both sides; stamens inserted a little above the base of the tube; leaves glabrous, brown when dry .. .. . 4. *S. ovalifolia*.

Corolla-tube and lobes sparsely villous without, tube glabrous and lobes slightly villous within; stamens inserted at the throat of the tube; leaves glabrous, yellowish-green when dry .. .. . 5. *S. flavescens*.

Corolla-tube and lobes glabrous on both sides, but lobes within with a dense tuft of bristles at the base; stamens inserted at about two-thirds of tube; leaves softly pubescent .. .. . 6. *S. rufa*.

Corolla-tube and lobes .125 to .25 in. long; leaves more or less coriaceous:—

Stamens inserted at the top of the tube:—

Ovary glabrous; corolla-lobes within furnished with a dense tuft of bristles at the base; leaves 3- to 5-ribbed .. .. . 7. *S. malaccensis*.

Ovary villous; corolla-lobes within villous-tufted; leaves 5- to 7-ribbed .. .. . 8. *S. septemnervis*

Stamens inserted at the middle of the tube:—

Lobes of corolla glabrous within behind a dense tuft of bristles; leaves usually 5-ribbed, more or less pubescent .. .. . 9. *S. pubescens*.

Lobes of corolla villous within behind a dense tuft of bristles; leaves 3-ribbed, nearly or quite glabrous .. .. . 10. *S. Ridleyi*.

Corolla-tube much longer than the lobes :—

Corolla-tube nearly .25 in. long ; lobes .1 in. long ; stamens  
inserted at top of tube ; berry large, many-seeded ; leaves  
glabrous, rather small . . . . .

.. 11. *S. Tieuté.*

1. *STRYCHNOS MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. IV. 88 (1883). A stout climbing shrub ; branches rough, brown ; branchlets somewhat angular, nearly black, densely studded with white prominent lenticels ; nodes swollen and marked by a prominent raised ring ; tendrils puberulous, in pairs, about 1 in. long, circinate, thickened upwards, supported by 2 small acute stipules on a .5 to 1 in. long stalk, each pair replacing a leaf near the ends of the branchlets. *Leaves* coriaceous ; elliptic, acuminate at apex, rounded at base ; glabrous on both surfaces, olivaceous-brown when dry ; 3 to 6 in. long, 1.25 to 3 in. broad ; 3- to 5-ribbed ; midrib stout, pale beneath and much raised, impressed above ; inner pair of side ribs from close above the base, curved upwards, parallel to the margin and looped in the upper half ; outside of them and close to the margin a second pair, more or less inconspicuous, also intramarginal and looped ; main nerves 6 to 8 pairs, commencing from the midrib about half-way up, very rarely opposite, straight or nearly so to join the principal pair of ribs at the loop sinuses ; secondary nerves few, branching ; reticulations irregular, prominent ; petiole .15 to .25 in. long, channelled above. *Cymes* axillary, sessile, paniculate, reaching 4 in. in length, much branched, the branches short, the rachis angular, pubescent ; bracteoles ovate-acute, ciliate, .05 to .1 in. long ; flowers extremely numerous, very small ; buds obovoid, rounded at tip. *Calyx* very small ; tube short ; lobes spreading, ovate-acute, ciliate, .03 in. long. *Corolla*-tube very short, about .025 in. long, glabrous without, long tawny-villous within ; lobes linear-oblong, .1 to .125 in. long, reflexed in flower. *Stamens* inserted near top of tube, nearly as long as corolla-lobes ; filaments slender, villous ; anthers .04 to .05 in. long, ovate, densely long-villous-hairy. *Ovary* rounded, glabrous ; style slender ; stigma capitate. *Berry* globose, about .5 to 1 in. in diam. ; endocarp smooth, black when dry. *Seeds* few, flattened, orbicular, .5 in. in diam. ; testa coriaceous ; cotyledons cordate, 3- to 5-nerved ; radicle short, stout.

PENANG : *Curtis* 3667. PERAK : *Scortechini* 1026 ; *Wray* 2009, 3112, 4279 ; *King's Collector* 6291, 8190. MALACCA : *Maingay* (K.D.) 1041, 1042. SINGAPORE : *Ridley* 5045.

2. *STRYCHNOS CURTISII*, King & Gamble, n. sp. A large climbing shrub, the stems reaching 6 in. in diam. ; branchlets pale brown, dull, somewhat angular, dotted with prominent white lenticels which are often elongate, uppermost pubescent ; nodes swollen and with a pale



pubescent ring; tendrils none (or not known!). *Leaves* coriaceous; ovate or ovate-oblong, rounded or slightly acute or shortly acuminate at apex, rounded or truncate or almost cordate at base; glabrous on both surfaces and olivaceous-brown when dry; 2·5 to 4 in. long, 1·5 to 2 in. broad; 3- to 5-ribbed; midrib stout, faintly impressed above, raised beneath; inner pair of ribs from about ·15 in. above the base, conspicuous, gradually curved to the apex, the upper one-half to one-third only looped; outer pair faint, intramarginal, looped and joined to the inner by cross nerves; main nerves about 6 pairs, arched; secondary nerves many, similar to but fainter than main nerves; reticulations irregular; petiole ·3 to ·5 in. long, black when dry, puberulous. *Cymes* axillary, sessile, corymbose, many-flowered, 3-chotomous, sparsely pubescent, reaching 2 to 2·5 in. in length and about 1·5 in. in breadth; rachises somewhat angled; primary branches ·5 to ·75 in. long, successive ones shorter; pedicels ·05 in. long; bracts lanceolate-acuminate, tawny-pubescent, ·1 to ·15 in. long, each pair clasping the rachis; bracteoles minute, pubescent, usually 1 or 2 to each pedicel; buds oblong, ·15 in. long, ribbed, puberulous; flowers pale green with a yellowish centre. *Calyx* small, pubescent; tube short; lobes rounded, ciliate, ·05 in. long. *Corolla*-tube ·06 in. long, one-third of the length of the lobes (·18 in.), glabrous within; lobes oblong-spathulate, thick, densely tawny-villous inside. *Stamens* inserted on the top of the tube; filaments slender, glabrous, ·1 in. long; anthers oblong, obtuse, not villous. *Ovary* rounded, pubescent; style slender, pubescent, ·1 to ·125 in. long; stigma capitate, often bifid. *Berry* not known.

PENANG: on Government Hill, *Curtis* 2973. PERAK: Gunong Bubu, at 1500 to 2000 ft., *King's Collector* 7702; Ulu Bubong, *King's Collector* 10281, 10438.

3. *STRYCHNOS LAURINA*, Wall. Cat. 1591 (1828). A stout climbing shrub; branches somewhat angular, with pale yellowish-brown shining bark; lenticels pale, often elongate; nodes swollen; tendrils puberulous at tip only, in pairs, about 1 to 1·5 in. long, circinate, thickened upwards, supported by 2 small acute stipules, on a ·75 in. long stalk, each pair replacing a leaf near the ends of the branchlets. *Leaves* subcoriaceous, elliptic-ovate or -oblong, acuminate at apex, rounded at base; glabrous on both surfaces; 3 to 6 in. long, 1·25 to 2·5 in. broad; 3-ribbed from a little above the base; midrib stout, pale beneath and raised, impressed above, as are the 2 inner ribs, which curve somewhat acutely upwards to the apex, not or only slightly looped above half-way up; outside them and close to the margin another pair more or less inconspicuous, making an intramarginal looped nerve; main nerves faint, 6 to 8 pairs, rarely opposite, straight from the midrib to join the

principal pair of ribs at the loop sinuses; secondary nerves few, branching; reticulations many, in an elegant network, inconspicuous; petiole .2 to .3 in. long, channelled above. *Cymes* pubescent, in rather short axillary sessile corymbs, or in elongate terminal panicles reaching 5 in. in length; rachises angular; bracteoles ovate-acute, ciliate; flowers very numerous, the buds obovoid. *Calyx* very small; tube short; lobes ovate-obtuse, ciliate, .03 to .05 in. long. *Corolla*-tube .075 in. long, glabrous without and at the base within, upper part within and lobes densely long tawny-villous; lobes .075 to .1 in. long. *Stamens* inserted at the middle of the tube; filaments slender, villous, .05 in. long; anthers as long, sparsely retrorse-villous at the base. *Ovary* rounded, villous, tapering into a conical style; stigma capitate. *Berry* globose, .5 to 1 in. in diam.; endocarp slightly rough and spotted. *Seeds* 1 to 2, orbicular, flattened on one surface, convex on the other; testa coriaceous. A. DC. Prodr. IX. 13; Benth. in Journ. Linn. Soc. I. 102; Kurz For. Fl. II. 166; Clarke in Hook. f. Fl. Br. Ind. IV. 88 (*excl. var.*).

MALACCA: *Maingay* (K.D.) 1035. PAHANG: *Ridley* 2161.—DISTRIB. India (Cachar, Burma, *Griffith* 3727, 3729).

*Wray* 1236 from "lower camp, Gunong Batu Pateh," Perak, is also probably this species, but the leaves are rather thinner and more lanceolate. So, too, probably, are *Scortechini* 295 and *King's Collector* 7193, which have very quadrangular branchlets and large leaves; but the specimens are too incomplete for certainty.

4. *STRYCHNOS OVALIFOLIA*, Wall. Cat. 1592 (1828). A large climbing shrub; branchlets slender, terete, with dark brown shining bark; lenticels few; nodes swollen and with a faint raised line; tendrils none (or not known!). *Leaves* chartaceous; ovate-lanceolate or -elliptic, acuminate at apex, cuneate at base; glabrous on both surfaces, 3 to 5 in. long, 1.5 to 2.5 in. broad, brown when dry; 3- to 5-ribbed; midrib rather slender, slightly impressed above, raised beneath, as are the 2 inner ribs which start from .2 to .4 in. above the base and are curved acutely upwards to the apex, looped only in the upper half; outside them and close to the margin another pair more or less conspicuous, with a marginal looped nerve; main nerves 4 to 5 pairs, faint, straight from the midrib to join the principal pair at the loop sinuses; secondary nerves many; reticulations irregular, fairly prominent; petiole slender, .25 to .5 in. long. *Cymes* axillary, paniculate, reaching about 2 in. in length, few-flowered; rachis angular, pubescent; bracteoles ovate-acute, ciliate; buds obovoid, short. *Calyx* very small; lobes ovate-obtuse, pubescent, ciliate, .05 in. long. *Corolla*-tube .06 in. long, glabrous, as are the lobes on both sides; lobes as long as tube. *Stamens* inserted a little above the base of the tube; filaments slender; anthers elongate, apiculate. *Ovary* rounded, glabrous, gradually contracted into the slender style; stigma

capitate. *Berry* globose, about .75 in. in diam.; endocarp thin, smooth. *Seeds* 1 to 3, oblong-orbicular, .8 by .5 in., flat, the margin undulate; testa crustaceous; cotyledons cordate. A. DC. Prodr. IX. 13; Benth. in Journ. Linn. Soc. I. 103. *S. laurina*, Wall., Clarke in Hook. f. Fl. Br. Ind. IV. 88 (*partly*).

PENANG: *Wallich* 1592; *Curtis* 3044, 3468. PERAK: *King's Collector* 4865. MALACCA: *Maingay* (K.D.) 1037.

5. *STRYCHNOS FLAVESCENS*, King & Gamble, n. sp. A large climbing shrub; branchlets slender, stiff, somewhat angular, with pale grey bark; nodes swollen; tendrils none (or not known). *Leaves* chartaceous; elliptic or elliptic-lanceolate, acute or acuminate at apex, attenuate or occasionally truncate or cordate at base; both surfaces glabrous, light yellowish green; 3 to 5 in. long, 1.5 to 2.75 in. broad; 3- to 5-ribbed from close above the base; midrib strong, somewhat impressed above, as is the inner pair of ribs which start at an angle of about 30° and curve upwards to the apex, faintly looped only near the top; outer pair of ribs quite inconspicuous, close to the margin and regularly looped; main nerves many, irregular, arched, only from 3 to 6 pairs joining the sinuses of the loops of the inner pair of ribs to the midrib; secondary nerves many; reticulations in an elegant network; petiole .3 in. long, channelled above. *Cymes* terminal, corymbose, minutely yellow-puberulous, reaching 4 in. in length and diam.; peduncle about 1 in. long; rachis angular; bracts linear or lanceolate, often leafy; bracteoles ovate-acute, enclosing the very short pedicels; buds globose; flowers minute, pale green. *Calyx* campanulate; tube short; lobes rounded, ciliate, .05 in. long, glabrous within. *Corolla*-tube cylindric, .05 in. long, glabrous within; lobes 4 or 5, as long as tube, sparsely villous without, more thickly so within. *Stamens* inserted on the throat of the tube; filaments extremely short; anthers ovate-acute, not villous, .025 in. long. *Ovary* globose, glabrous; style very short; stigma punctate. *Berry* obovoid, about 1 in. long, .5 in. in diam.; pericarp very thin, greenish, smooth. *Seeds* 2, inner face flattened, outer convex; .6 in. long, .5 in. broad.

PENANG: at Waterfall, *Curtis* 3430, 3667. PERAK: at Larut, *Scortechini* 1498; *King's Collector* 4998. MALACCA: at Ayer Panas, *Curtis* 3490.

6. *STRYCHNOS RUFA*, Clarke in Hook. f. Fl. Br. Ind. IV. 89 (1883). A climbing (?) shrub; branches pale brown, smooth, lenticellate; branchlets slender, patently rufous-pubescent, slightly angular; nodes somewhat swollen; tendrils none (so far as known). *Leaves* chartaceous; elliptic or elliptic-ovate, acute at apex, cuneate or rounded or subcordate at base; upper surface sparsely pubescent or glabrate, lower surface softly rufous-pubescent; 2.5 to 4.5 in. long, 1.5 to 2 in. broad; 3- to 5-ribbed; midrib rather

stout; inner pair of ribs more slender from a short distance only above the base, at about  $40^\circ$  with the midrib, slightly looped above; outer pair inconspicuous, much looped; main nerves 3 to 4 pairs, joining the midrib and side nerves and nearly straight; secondary nerves many, arched; reticulations fairly conspicuous; petiole .15 in. long. *Cymes* small, axillary, scarcely reaching .5 in. long, .75 in. broad; sessile, rufous-pubescent; branches trichotomous; pedicels slender, .1 in. long; bracteoles linear, small; buds small, oblong. *Calyx* very small; lobes ovate, acute, .05 in. long. *Corolla*-tube campanulate, .06 in. long, glabrous within, puberulous without; lobes a little shorter than tube, also glabrous within, but with a thick white tuft of bristly hairs at the base of each. *Stamens* inserted at about two-thirds of the height of the tube; filaments very short; anthers ovate, apiculate, retrorsely villous-hairy below. *Ovary* globose, glabrous; style very short; stigma capitate. *Berry* globose or oblong, .5 to 1.25 in. in diam., few-seeded; pericarp thick. *Seeds* ovate-oblong, compressed, .75 in. long by .5 in. broad; albumen thin.

PERAK: at Tapa and Relan Tujor, Wray 1334, 4033; at Campar, Ridley 9698; King's Collector 3973, 6199, 10187. MALACCA: Maingay (K.D.) 1034. SELANGOR: at Kwala Lumpor, Curtis 2398.

We have felt a little doubt about this species, which is merely represented by one fruiting specimen in the Kew Herbarium; but believe the identifications to be correct. The flowers are described from Curtis's specimen, the fruits from Maingay's and Wray's 1334.

7. *STRYCHNOS MALACCENSIS*, Benth. in Journ. Linn. Soc. I. 101 (1857). A climbing shrub; branchlets dark brown, terete, puberulous; nodes slightly swollen; tendrils pubescent, single or in pairs, reaching 1 to 2 in. in length, circinate, thickened upwards but again reduced at the tip, each replacing a leaf at the ends of the branchlets. *Leaves* subcoriaceous; ovate or elliptic-ovate, acute at apex, cuneate to rounded at base; glabrous on both surfaces, except in young leaves and on the midrib beneath; 2 to 4 in. long, 1.5 to 2 in. broad; 3- to 5-ribbed; midrib slender, impressed above; inner pair of ribs from about .5 in. above the base, starting at an angle of about  $30^\circ$  with the midrib, curving upwards to the apex, looped in the upper third; outer pair intramarginal, slender, looped; main nerves about 5 pairs, straight from the midrib to the inner ribs; reticulations many, in an elegant network; petiole .2 to .3 in. long, slender. *Cymes* axillary, corymbose, reaching 1 in. long and broad, fulvous-pubescent; peduncles .3 in. long; bracteoles very small; pedicels slender; flowers small, greyish-white; buds obovoid. *Calyx* very small; tube short; lobes ovate, acute, ciliate, puberulous, .05 in. long. *Corolla*-tube campanulate, .06 to .07 in. long, minutely

pubescent in the upper part within or nearly glabrous, puberulous without; lobes as long as or a little shorter than tube, with a dense tuft of pale bristles at the base within, otherwise glabrous. *Stamens* inserted at the top of the tube; filaments very short; anthers ovoid, .03 in. long, densely hairy, especially with retrorse hairs at the base. *Ovary* conoidal, glabrous, gradually attenuated into a rather thick style .05 in. long; stigma capitate. *Berry* ovoid, 1 in. long by .75 in. in diam.; pericarp of two layers, outer pergamaceous, shining, thin, inner hard, woody. *Seed* 1, oblong; albumen horny, copious; cotyledons ovate-acute, strongly nerved, .1 in. long; radicle thick. Miq. Fl. Ind. Bat. II. 379, 1080; Clarke in Hook. f. Fl. Br. Ind. IV. 89. *S. Gauthierana*, Pierre MS. in Herb. Kew.

PENANG: *Curtis* 1515; *King's Collector* 1539. MALACCA: *Griffith* (K.D.) 3724.—DISTRIB. Burma (Tenasserim or Andamans, *Helper* 3724; *Tavoy*, *Shaikh Mokim* 336), Cambodia.

8. *STRYCHNOS SEPTEMNERVIS*, Clarke in Hook. f. Fl. Br. Ind. IV. 88 (1883). A climbing shrub; branches stout, obscurely angled, pale brown, sparsely lenticellate, swollen at the nodes and prominently ringed; tendrils none (or not known!). *Leaves* coriaceous; elliptic, shortly acuminate at apex, attenuate at base, glabrous on both surfaces; 2.5 to 4.5 in. long, 1.5 to 2.5 in. broad; 5- to 7-ribbed; midrib stout, more or less raised on both surfaces; inner pair of ribs from about .25 in. above the base, strong, acutely angled (about 10° at first) with the midrib and curving upwards to the apex, looped in the upper half, next pair much less conspicuous; outer pair faint or absent; main nerves many pairs, arched between the midrib and first side ribs; reticulations strong, prominent on both surfaces; petiole .3 to .4 in. long. *Cymes* axillary, sessile, many-flowered, reaching 5 in. in length but usually shorter, rusty-pubescent; rachis somewhat angled; bracts small, ovate, acute, ciliate; flowers rather large; buds oblong-obovoid. *Calyx* very small; lobes ovate, acute or obtuse, ciliate, .05 in. long. *Corolla*-tube campanulate, .15 in. long, glabrous without, pubescent within in upper part and with villous tufts at the throat; lobes .1 in. long, recurved, pubescent within. *Stamens* inserted at the top of the tube; filaments short, villous, .025 in. long; anthers oblong, apiculate, .05 in. long, exsert, villous. *Ovary* conical, villous, gradually narrowed into a .15 in. long exsert style, villous below; stigma capitate or obsoletely lobed. *Berry* rather small, reaching .5 in. in length, ovoid; pericarp smooth, crustaceous, thin. *Seed* 1, flat, round.

PENANG: at Penara Bukit, *Curtis* 1021. MALACCA: *Maingay* (K.D.) 1036.

9. *STRYCHNOS PUBESCENS*, Clarke in Hook. f. Fl. Br. Ind. IV. 89 (1883). A large climbing shrub; branchlets rather slender, tawny-pubescent, brown, somewhat striate; nodes swollen, with a ring; tendrils single, circinate, tawny-pubescent, enlarged upwards, 1 to 1·5 in. long, each replacing a leaf in end branchlets or occasionally axillary. *Leaves* yellow when dry, subcoriaceous; ovate, acute at apex, rounded or sometimes attenuate at base, sometimes cordate on ultimate branchlets; upper surface glabrous or puberulous, lower glabrescent when old, pubescent when young; 1 to 3·5 in. long, ·75 to 2·25 in. broad; 3- to 5-ribbed, midrib and ribs conspicuous, strongly impressed above; inner pair of ribs from about ·3 to ·6 in. above the base, starting at about 30°, outer pair at about 45° with the midrib starting from close to the base; main nerves joining them to the midrib arched, about 6 pairs; reticulations obscure; petiole ·1 to ·2 in. long. *Cymes* small, axillary and subterminal, dense, up to ·75 in. in diam., tawny-puberulous to pubescent; bracts lanceolate, small; pedicels short, with 2 bracteoles; buds oblong; flowers white. *Calyx* very small; lobes rounded, ciliate, ·04 in. long. *Corolla*-tube a little longer than the lobes, cylindric, minutely puberulous without, glabrous within; lobes glabrous within, but each with a dense tuft of white bristles at its base; tube and lobes together ·125 in. long. *Stamens* inserted on the middle of the tube, sessile or with minute filaments; anthers ovate, ·025 in. long, apiculate, retrorsely sparsely hairy at base only. *Ovary* glabrous; style very short; stigma capitate. *Berry* globose, ·3 to ·6 in. in diam.; pericarp thin, crustaceous. *Seeds* 1 to 2, flat or concave on one surface, convex on the other, ·5 in. long by ·4 in. broad.

PENANG: *Curtis* 970, 3649. PERAK: at Larút, *Scortechini* 1485; at Relan Tujor, *Wray* 1916; at Thaipeng, *Wray* 3048; at Selama, *Wray* 4278; at Larút, *King's Collector* 2441, 3623, 6276, 6477. MALACCA: *Maingay* (K.D.) 1040; *Curtis* 3494. NEGRI SEMBILAN: at Perhentian Tinggi, *Ridley* 10089. SINGAPORE: at Bukit Timah, *Ridley* 6317.

*Scortechini*, in his notes on his No. 1858, says he thinks that that specimen "shows some differences from *S. pubescens* which may amount to specific distinction; the flowers being pedicellate, the apex of the anthers obtuse, and the style long." No. 1858 is clearly the very last part of a long climbing branch, and such parts often differ a good deal from the more typical parts, so that we are doubtful of its being capable of separation, and prefer to call it:—

VAR. *Scortechinii*, King & Gamble. *Leaves* ovate, acute at apex, rounded at base or almost cordate, densely, softly rusty-tomentose on the lower surface; ribs 3 to 5, starting close to the base. *Cymes* small, axillary. *Stamens* inserted above the middle of the tube of the corolla, not apiculate. *Style* longer than in type. *Berry* oblong.

PERAK: at Dambung Batak, *Scortechini* 1858.

10. *STRYCHNOS RIDLEYI*, King & Gamble, n. sp. A climbing shrub; branchlets slender, terete, nearly black when dry, uppermost only sparsely pubescent; nodes slightly swollen, with a pale line; tendrils single, much circinate, much enlarged upwards, nearly 2 in. long. *Leaves* subcoriaceous, nearly black when dry; ovate or ovate-lanceolate, acute at apex, attenuate or rounded at base; glabrous on both surfaces except for faint tufts in the rib-axils beneath; 1.5 to 3.25 in. long, 1 to 1.75 in. broad; 3- to 5-ribbed, midrib strong, impressed above; inner pair of ribs more slender, from .1 to .2 in. above the base, starting at an angle of about 30° with the midrib, curving upwards to the apex and distantly looped above; near the margin a very faint pair looped and intramarginal; main nerves few, 2 to 3 pairs, straight to the sinuses of the loops of the side ribs; secondary nerves many; reticulations slender, inconspicuous; petiole .3 to .4 in. long, rather stout. *Cymes* axillary, few-flowered, puberulous, reaching .75 in. in length and diameter; peduncles .25 in. long; bracts lanceolate, sheathing, ciliate; bracteoles minute, rounded or acute; pedicels about .05 in. long; buds oblong, black when dry. *Calyx* very small; lobes broad, obtuse, .04 in. long, ciliate. *Corolla*-tube campanulate, .075 in. long, glabrous on both surfaces; lobes as long as tube, glabrous without, densely villous within, and furnished at the base with tufts of pale bristles. *Stamens* inserted at the middle of the corolla-tube; filaments very short; anthers ovate, rounded, .035 in. long, sparsely villous at the base. *Ovary* globose, glabrous, with a short style and capitate stigma. *Fruit* unknown.

SINGAPORE: at Toas, *Ridley* 6313.

This species resembles *S. pubescens* in having the stamens inserted at the middle of the corolla-tube, and in the globose ovary and short style, but the lobes of the corolla are villous within, and the leaves are quite different.

11. *STRYCHNOS TIEUTÉ*, Lesch. in Ann. Mus. Hist. Nat. XVI. 479, t. 23 (1810). A large climbing shrub; branches grey, lenticellate, stiff; branchlets dark brown, slender; nodes somewhat swollen; tendrils single, circinate, much enlarged upwards and at length woody, 1 to 2 in. long, glabrous, replacing an occasional leaf of a pair on ultimate branchlets. *Leaves* chartaceous or subcoriaceous; elliptic or elliptic-lanceolate, bluntly caudate-acuminate at apex, acute or rounded at base; both surfaces glabrous, olive-brown, upper shining; 2.5 to 3.5 in. long, 1 to 1.5 in. broad; 3- to 5-ribbed, midrib slender, impressed above; inner pair of ribs from about .15 in. above the base, prominent, starting at an angle of 40° or less with the midrib and curving upwards to the apex, looped above the middle; outer pair obscure, forming a faint intramarginal looped rib more or less to the apex; main nerves 3 to 6 pairs,

reaching the sinuses of the loops of the inner basal ribs; secondary nerves very many, similar to main nerves; reticulations prominent, irregular; petiole .2 to .3 in. long, curved. *Cymes* axillary, corymbose, usually sessile, reaching 1 in. in length and 1.25 in. in breadth, few- (12- to 18-) flowered; peduncles short; branches of rachis very slender, 3-chotomous; bracts linear, short; bracteoles minute, rounded, 2 to each pedicel below the calyx; pedicels puberulous, .1 to .25 in. long; flower-buds clavate, top rounded; flowers white, sweet-scented. *Calyx* very small; lobes ovate-lanceolate, acute, .05 in. long. *Corolla* infundibuliform; tube slender, .2 to .25 in. long, minutely puberulous without, glabrous within; lobes oblong, .1 in. long, glabrous. *Stamens* inserted at the top of the tube; filaments very short, but decurrent in lines down the interior of the tube; anthers oblong, .05 in. long, apiculate, glabrous. *Ovary* ovoid, glabrous, alternated into a .25 in. long style; stigma capitate, obtuse. *Berry* globose, many-seeded, 1.5 to 2.5 in. in diameter; pericarp thick, woody, shining, smooth, yellowish at first, afterwards red. *Seeds* immersed in pulp, rounded, ovoid or oblong, more or less flattened, usually .75 in. long, and about .25 in. broad; testa thin, silvery; albumen horny; cotyledons cordate, acute, 3- to 5-nerved, .15 in. long; radicle stout, cylindric, as long as cotyledons. Bl. Rumph. I. 67, t. 24; A. DC. Prodr. IX. 13; Miq. Fl. Ind. Bat. II. 380. *S. Maingayi* var. ? *fructuosa*, Clarke in Hook. f. Fl. Br. Ind. IV. 88.

PENANG: *Curtis* 709, 1490; *Ridley* 9358. PERAK: *King's Collector* 5348, 10595. MALACCA: *Maingay* (K.D.) 1038; *Corporal Ali* and *Corporal Hasan*. SINGAPORE: *Ridley*. — *DISTRIB.* Java (*Horsfield*, *Zollinger*), Borneo (*Beccari* 1580).

*King's Collector*, No. 10311, from Perak, agrees fairly well with *S. Horsfieldiana*, Miq., but the specimens are too incomplete to warrant description.

## 7. GAERTNERA, Lamk.

Trees or shrubs. *Leaves* opposite, rarely ternate, entire, coriaceous, penninerved; stipules connate into a cylindrical sheath. *Cymes* axillary or terminal, many- or 3- to 1-flowered. *Calyx* small, funnel-shaped or campanulate. *Corolla*-tube longer than the calyx; its limb with 4 or 5 lobes; valvate in bud. *Stamens* adnate to the corolla-tube by short filaments. *Ovary* 2-celled; style short or long; stigmas 2, linear or clavate; ovule solitary in each cell, erect. *Berry* didymous, sub-globose, crustaceous. *Seeds* often compressed; albumen horny or fleshy; embryo small. — *DISTRIB.* About 40 species, in the tropics of Asia and Africa.



Leaves glabrous :—

Leaves narrowly elliptic-oblong, usually under 4 in. in length :—

Flowers 4-merous .. .. . 1. *G. viminea*.

Flowers 5-merous .. .. . 2. *G. Koenigii* var. *[oxyphylla]*.

Leaves oblong-oblancheolate, much tapered to the long petiole,

7 to 12 in. in length :—

Cymes densely umbellate, crowded.. .. . 3. *G. obesa*.

Cymes laxly paniculate.. .. . 4. *G. oblanceolata*.

Leaves hairy beneath, elliptic-oblong, slightly narrowed at the base; petiole not very long .. .. . 5. *G. grisea*.

1. GAERTNERA VIMINEA, Hook. f. ex Clarke in Fl. Br. Ind. IV. 91 (1883). A shrub; young shoots as thick as a crow-quill, glabrous. *Leaves* membranous; narrowly lanceolate, apex caudate-acuminate, the base much narrowed; both surfaces brown when dry, the upper glabrous, the lower minutely scaly; length 2·5 to 3·5 in., breadth ·6 to ·8 in.; petiole about ·1 in. long. *Flowers* only about ·25 in. long, in small terminal trichotomous nearly glabrous cymes; lowest bracts linear, sometimes ·4 in. long; pedicels very short. *Calyx* cupular, with 4 spreading teeth. *Corolla* villous at the throat, 4-lobed. *Fruit* obovoid-globose, ·2 in. long. *Psychotria viminea*, Wall. Cat. 8354.

SINGAPORE: Wallich 8354; Ridley 4828, 9500.

2. GAERTNERA KOENIGII, Wight Ic. 1318 (1850); var. OXYPHYLLA, Clarke in Hook. f. Fl. Br. Ind. IV. 91 (1883). A small tree; all parts except the inflorescence glabrous; young branches thicker than a crow-quill, pale brown, terete. *Leaves* thinly coriaceous; narrowly elliptic-oblong, sometimes somewhat oblanceolate, apex shortly caudate-acuminate, base much narrowed; both surfaces pale olivaceous-brown when dry, the lower minutely scaly; midrib distinct; main nerves 6 to 8 pairs, curving upwards, thin but distinct on the lower surface; length 2·5 to 4 in., breadth ·8 to 1·35 in.; petiole ·2 to ·4 in. long. *Stipules* forming an oblong sheath, 5-toothed or bifid, ·25 in. long; the apex and ultimately the whole deciduous. *Panicles* terminal, cymose, lax, less than half as long as the leaves when in flower, elongating in fruit; branches divaricate, opposite, the ultimate branches 3-flowered. *Flowers* ·25 in. long, on puberulous pedicels longer or shorter than themselves, bracteolate near the apex. *Calyx* short, tubular, irregularly 5-toothed. *Corolla* tubular, glabrous outside, slightly curved; the mouth with 5 (sometimes 4) thick spreading subacute lobes. *Stamens* included; anthers linear, slightly bifid at the base, on short filaments. *Ovary* 2-celled, each cell 1-ovuled. *Fruit* globular, ·3 in. in diam., slightly compressed, with a deep vertical groove on each side (subdidymous), glabrous, smooth; the apex areolate, but without remains of the calyx. *G. thyrsiflora*, Blume

Mus. Bot. Lugd.-Bat. 174; Benth. in Journ. Linn. Soc. I. 112. *G. acuminata*, Benth. *l. c.* *G. Junghuhnii*, Miq. Fl. Ind. Bat. II. 383. *Sykesia Koenigii* and *S. thyrsiflora*, Arn. Pug. Pl. Ind. Or. 35; DC. Prodr. IX. 35. *Psychotria vaginans*, DC. Prodr. IV. 520; W. & A. Prodr. 434. *Psychotria* sp., Wall. Cat. 8342, 8388. *P. oxyphylla* Wall. Cat. 8374; Benth. *l. c.*

PERAK: at elevations over 3000 ft., *Scortechini* 305; *King's Collector* 8063; *Wray* 214, 279, 4113, 4122.

3. GAERTNERA OBESA, Hook. f. Fl. Br. Ind. IV. 92 (1883). A small shrub; young branches compressed, as thick as a swan's quill or thicker, almost glabrous, pale brown, their apices often quite enveloped in the large stipules. *Leaves* subcoriaceous, large; oblong-lanceolate or oblong-elliptic, shortly acuminate at apex, narrowed at the base into the stout winged petiole; both surfaces drying brown, glabrous, the lower minutely lepidote when young; midrib broad; main nerves 9 to 12 pairs, slightly curved, ascending, conspicuous on the lower surface, the intermediate nerves also distinct although thin; length 9 to 12 in., breadth 3 to 3.5 in.; petiole 1 to 1.5 in. long, broadly channelled; its upper part winged. *Stipules* 1.25 to 1.5 in. long, coriaceous, broadly oblong, acuminate when young, but afterwards, from the breaking off of the upper part, blunt or obscurely bifid; the base auricled. *Cymes* (including their peduncles) not much exceeding the leaf-petioles in length, usually terminal, densely umbellate, about 1.25 in. across, bearing about 3 umbellate main branches compressed and puberulous like the peduncle but much shorter, and at the base several linear bracts about .5 in. long. *Flowers* .3 in. long, sessile or shortly pedicelled in short, few-flowered, broadly bracteolate cymelets on the ultimate branchlets. *Calyx* campanulate, puberulous outside; the limb obscurely toothed, entire and truncate, enlarging with age. *Corolla* twice as long as the calyx, fleshy, tubular; the limb with 5 short acute inflexed lobes, glabrous outside, densely hairy in the upper half inside. *Anthers* 5, oblong, blunt, cordate at the base, inserted by short filaments near the base of the tube. *Fruit* unknown. *Psychotria obesa*, Wall. Cat. 8328.

PERAK: *Scortechini*. MALACCA: *Maingay* (K.D.) 925. SINGAPORE: on Bukit Timah, *Ridley* 2680; *Hullett* 118, 137; *Walker* 212.

VAR. *angustifolia*, King & Gamble. *Leaves* not exceeding 2.75 in. in breadth. *Cymes* axillary, 1.5 in. long.

PERAK: *Scortechini*. Only a single specimen collected.

4. GAERTNERA OBLANCEOLATA, King & Gamble, n. sp. A glabrous shrub, 4 to 8 ft. high; branches about as thick as a goose-quill, sub-quadrangular, dark-coloured. *Leaves* subcoriaceous; oblong-oblancoolate, shortly and somewhat abruptly acuminate, gradually narrowed

from above the middle to the short petiole; both surfaces when dry brown, tinged (especially on the paler lower surface) with olivaceous, the midrib prominent on both; the 10 to 12 pairs of curved ascending main nerves prominent on the lower but indistinct on the upper surface; length 7 to 9 in., breadth 1·75 to 3·5 in.; petiole ·6 to 1 in. long. *Stipules* spathaceous, 1·25 in. long, opening on one side, embracing the petiole by a rounded basal wing; the upper part caducous and leaving the irregularly quadrate, persistent, coriaceous, pale, margined base. *Cymes* paniculate, lax, with a few linear deflexed bracteoles, supra-axillary, about 3 in. long (longer in fruit), one-third being peduncle; the branches few, lax, the lower deflexed. *Flowers* in threes, rather crowded towards the apices of the branches, on thick pedicels shorter than themselves, before expansion only about 1 in. long. *Calyx* cylindric; the mouth under ·1 in. in diam., very shortly 5-toothed, glabrous outside like the corolla. *Corolla*-tube twice as long as the calyx, constricted above the middle; the lobes triangular, thick; the throat very hairy inside. *Anthers* hidden amongst hairs; their filaments short. *Ovary* 2-celled, the cells 1-ovuled. *Fruit* glabrous, obliquely obovoid or globular, but somewhat contracted at the base, crowned by the minute remains of the calyx, about ·3 in. in length. *Seed* (by abortion) solitary, with much horny albumen.

PERAK: *Scortechini* 203; *Wray* 1948, 2283; *King's Collector* 8449.

5. *GAERTNERA* GRISEA, Hook. f. Fl. Br. Ind. IV. 92 (1883). A small bush; young branches as thick as a swan- or goose-quill, compressed, pale, minutely pubescent. *Leaves* coriaceous, large; oblong or elliptic-oblong, apex shortly acuminate, base rounded or cuneate; edges slightly recurved; upper surface glabrous, lower softly pale-cinereous-pubescent; main nerves 8 or 9 pairs, oblique, slightly curved, bold on the lower surface, faint on the upper; midrib broad, prominent on the lower surface (when dry), flat on the upper; length 8 to 11 in., breadth 2 to 4·5 in.; petiole ·35 to ·75 in.; intra-petiolar stipules united to form an adpressed cinereous-pubescent sheath, ·75 in. long, with 1 or 2 apical points. *Cymes* terminal or axillary, solitary, 2·5 to 5 in. long and 2 to 3 in. across, cinereous-pubescent everywhere, on peduncles 1 to 4 in. long, trichotomous and with small triangular bracts at the divisions. *Flowers* ·25 to ·3 in. long. *Calyx* under ·1 in. long, campanulate, with 5 broad, triangular, spreading teeth. *Corolla* ·2 to ·25 in. long, thick, cylindric; limb short, with 5 deep, oblong-lanceolate, valvate lobes with inflexed tips. *Anthers* 5, linear, inserted by short filaments below the glabrous throat. *Style* thick; stigma with 2 broad lobes. *Ovary* 2-celled; ovules numerous. *Fruit* unknown. *Psychotria*?, Wall. Cat. 8389.

JOHORE: *Ridley* 11123; *Murton* 159. SINGAPORE: *Wallich*; *Ridley* 2697.

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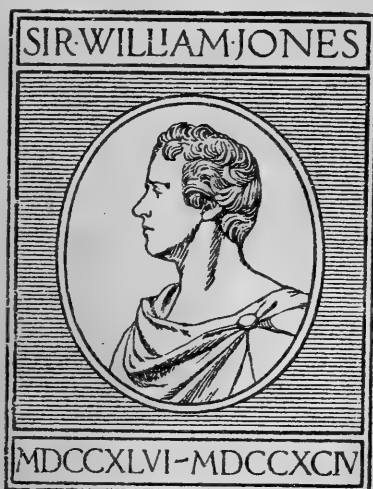
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<i>Superintendent of the Royal Botanic Garden, Calcutta ;</i>	
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**Note.**—On the cover of the first part of this volume for  
“vol. i. extra number” read “vol. lxxiv. part i.”

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# JOURNAL

## OF THE

### ASIATIC SOCIETY OF BENGAL.

VOL. LXXIV., PART II.—Extra Number, 1907.

*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 20.

The present Part contains the descriptions of three Families, No. 89 *Acanthaceæ*, which was only finished by the late Mr. C. B. Clarke, F.R.S., just before his lamented death in August, 1906, and Nos. 91 *Labiata* and 92 *Plantaginaceæ*, which have been done by Lt.-Col. Prain, C.I.E., F.R.S., Director of the Royal Gardens, Kew.

The 3 Families comprise 54 genera and 166 species. In the *Acanthaceæ* there are 35 genera and 134 species, of which 5 genera and 68 species are new. In the *Labiata* the genera are 18 and the species 31, one genus being newly described. But it is worthy of note that of the 31 species only 16 are really native in the Malay Peninsula, the rest being introduced plants. One species only is endemic, *Plectranthus Kunstleri*, Prain. In *Plantaginaceæ* there is merely one genus containing one species, an introduced weed.

It may here be usefully recorded that, in addition to his work on the Malay Peninsula *Acanthaceæ* herein given, the late Mr. Clarke also prepared an account of the species of the Malay Archipelago, which will shortly be published in the 'Journal of the Linnean Society.'

Part No. 21, which will contain two Families, No. 86 *Gesneraceæ* and No. 90 *Verbenaceæ*, and thus complete the Gamopetalæ, may be expected to issue about the New Year.

## Family LXXXIX.—ACANTHACEÆ.

[By C. B. CLARKE.]

Herbs or shrubs, or twining plants (*Thunbergia*). *Leaves* opposite, often unequal, in *Polytrema* sometimes pseudalterate; stipules 0. *Inflorescence* various; spikes strobilate or heads or cymose or flowers solitary; bracts and prophylla large, small or 0. *Flowers* 2-sexual, irregular. *Calyx* inferior; segments 5 or 4, nearly free or more or less united. *Corolla* gamopetalous; tube campanulate or linear; limb 2-lipped or 5-lobed, more or less 1-sided. *Stamens* on the corolla 4 didynamous, or 2 (with or without rudiments); anther-cells 2 or 1; pollen ellipsoid (then usually ribbed or banded longitudinally) or globose (then often honeycombed or echinulate). *Ovary* superior, 2-celled; ovules 2 to 1, or several, superimposed in vertical rows (or 2 collateral in *Thunbergia*); style long, simple, minutely 2-fid. *Capsule* loculicidal, often elastically dehiscent; seeds usually nearly as many as the ovules, held up on rigid curved *retinacula* (outgrowths of the funicle); albumen 0.—DISTRIB. Species 2000, throughout the warmer parts of the world.

This Family is specially characterized by the *retinacula* and the seeds placed in a vertical line; this character fails in the first two Subfamilies. The plants of Subfamily II. NELSONIOIDÆ are frequently mistaken for those of SCROPHULARIACEÆ, from which they differ by the seeds being superimposed vertically.

## CONSPECTUS OF THE SUBFAMILIES, TRIBES, AND GENERA.

- Subfamily I. THUNBERGIOIDÆ. Seeds 4 to 2 in the capsule without *retinacula*. Twiners .. .. 1. THUNBERGIA.
- Subfamily II. NELSONIOIDÆ. Seeds 8 to 16, vertically superimposed in 2 rows in the capsule on small soft papillæ (not on hard curved *retinacula*). Herbs small or of very moderate size :—
- Stamens 2 .. .. 2. NELSONIA.
- Stamens 4 :—
- Flowers in spikes, racemes, or panicles .. .. 3. STAUBROGYNE.
- Flowers axillary .. .. 4. CARDANTHERA.
- Subfamily III. RUELLIOIDÆ. *Retinacula* present. Corolla-lobes contorted in the bud :—
- Tribe 1. RUELLINÆ. Capsule with more than 4 seeds, which are hygroscopically shaggy on the margin :—
- Pollen honeycombed. Flowers axillary. Capsule clavate .. 7. RUELLIA.
- Pollen echinate. Capsule seed-bearing from the base .. 8. APORUELLIA.
- Pollen ellipsoid, with many longitudinal ribs. Capsule hardly stalked :—

Corolla distinctly 2-lipped:—

- |                                                |                |
|------------------------------------------------|----------------|
| Spikes contiguous or axillary clusters .. ..   | 5. HYGROPHILA. |
| Flowers in 1-sided axillary open racemes .. .. | 6. NOMAPHILA.  |

Corolla obscurely or scarcely 2-lipped:—

- |                                                |                  |
|------------------------------------------------|------------------|
| Thyrus terminal, 8 to 12 by .75 in. .. ..      | 9. STENOTHYRSUS. |
| Spikes terminal or short-peduncled heads .. .. | 10. HEMIGRAPHIS. |

Tribe 2. STROBILANTHINÆ. Capsule with 4 (or 2) seeds:—

Pollen ellipsoid, longitudinally ribbed:—

- |                                           |                    |
|-------------------------------------------|--------------------|
| Stamens 4 .. ..                           | 12. STROBILANTHES. |
| Stamens 2 .. ..                           | 11. ENDOPOGON.     |
| Pollen globose, echinate. Stamens 4 .. .. | 13. ACANTHOPALE.   |

Subfamily IV. ACANTHOIDEÆ. Retinacula present. Corolla with the posticous lip cut away; anticus lip 3-lobed, the middle lobe bifid .. ..

14. ACANTHUS.

Subfamily V. JUSTICIOIDEÆ. Retinacula present. Corolla-lobes imbricated in the bud, *i. e.* one lobe wholly within, one wholly without, the others:—

Tribe 1. GYMNSTACHYINÆ. Capsule with more than 4 seeds.

Bracts inconspicuous, hardly as long as the small sepals, which rarely attain one-fifth inch in length. Stamens 2:—

- |                                                           |                    |
|-----------------------------------------------------------|--------------------|
| Capsule cylindric at base; seeds in the clavate top .. .. | 16. PHLOGACANTHUS. |
|-----------------------------------------------------------|--------------------|

Capsule with parallel sides; seed-bearing from the base:—

Corolla-tube cylindric, scarcely inflated:—

- |                                                 |                   |
|-------------------------------------------------|-------------------|
| Seeds hygroscopically hairy on the margin .. .. | 15. GYMNSTACHYUM. |
| Seeds glabrous, stony .. ..                     | 17. ANDROGRAPHIS. |
| Corolla-tube much inflated upwards .. ..        | 18. CYSTACANTHUS. |

Tribe 2. ASYSTASINÆ. Capsule with 4 seeds. Stamens 4:—

- |                                                              |                    |
|--------------------------------------------------------------|--------------------|
| Sepals united at base for at least one-third of their length | 20. PHIALACANTHUS. |
|--------------------------------------------------------------|--------------------|

Sepals nearly free at base:—

Capsule at base cylindric; seeds in the upper wider part:—

- |                                       |                |
|---------------------------------------|----------------|
| Anther-cells at equal height .. ..    | 19. ASYSTASIA. |
| One anther-cell below the other .. .. | 21. FILETIA.   |

- |                                                |                   |
|------------------------------------------------|-------------------|
| Capsule conic; the 4 seeds near the base .. .. | 22. LEPIDAGATHIS. |
|------------------------------------------------|-------------------|

Tribe 3. BARLERIINÆ. Capsule 2- to 4-seeded. Stamens 2, fertile. Calyx large, 4-partite to the base. Anther-cells 2, rounded at base. Pollen globose, reticulated. Corolla yellow, 1.25 in. long .. ..

23. BARLERIA.

Tribe 4. ERANTHEMINÆ. Capsule 4- to 2-seeded. Stamens 2. Anther-cells 2, rounded at base. Corolla-tube linear; limb subequally 5-fid, spreading .. ..

24. ERANTHEMUM.

Tribe 5. JUSTICIINÆ. Capsule 4- to 2-seeded. Corolla distinctly 2-lipped. Stamens 2. Calyx small, subequally deeply lobed. Seeds smooth or tuberculate, but without needle-like hygroscopic hairs:—

Sect. 1. MONOTHECIÆ. Anthers 1-celled:—

- |                                         |                   |
|-----------------------------------------|-------------------|
| Corolla 1.25 in. long, orange-red .. .. | 25. CLINACANTHUS. |
|-----------------------------------------|-------------------|

Sect. 2. TYPICÆ. Anthers 2-celled. The flower not appearing as though enclosed between two opposite bracts. Placentæ in fruit not rising elastically from the base of the capsule:—

- One anther-cell below the other, tailed .. .. 26. *JUSTICIA*.  
 One anther-cell somewhat below the other, its base rounded or acute, scarcely tailed:—  
   Corolla-tube broad. Shrub .. .. 27. *ADHATODA*.  
   Corolla-tube linear; posticous lip small, twisted .. 28. *RHINACANTHUS*.  
 Anther-cells at equal or nearly equal height, not tailed:—  
   Corolla .3 to .7 in. long:—  
     Spikes, racemes, or panicles terminal .. .. 29. *LEDA*.  
     Cymes small, axillary .. .. 30. *POLYTREMA*.  
   Corolla 1.25 in. long:—  
     Corolla green-blue .. .. 31. *ECBOLIUM*.  
     Corolla red .. .. 32. *GRAPTOPHYLLUM*.  
 Sect. 3. *HYPOESTÆ*. Flower appearing as though enclosed between two bracts. Placentæ in fruit not rising elastically:—  
   Anther-cells 2, one placed higher .. .. 33. *PERISTROPHE*.  
   Anthers 1-celled .. .. 34. *HYPOESTES*.  
 Sect. 4. *SOLUTÆ*. Placentæ rising in fruit elastically from the base of the capsule, and throwing out the seeds:—  
   Flowers in spikes, with prominent bracts .. .. 35. *RUNGIA*.

1. *THUNBERGIA*, Linn. f.

[Character narrowed, as throughout *Acanthaceæ*, to the Malay Peninsula species.]

**Twiners.** *Leaves* petioled, opposite, subequal, undivided, often toothed or lobed. *Peduncles* solitary, axillary, running into terminal racemes, *i. e.* the upper floral leaves (or bracts) greatly reduced, inconspicuous or obsolete. *Bracteoles* (prophylla) large, often .5 in. long, broad-oblong from a truncate base. *Calyx* of 8 to 14 small lanceolate teeth, or obsolete (appears a mere rim). *Corolla* large; tube cylindric or campanulate; limb of 5 subequal lobes, contorted in the bud. *Stamens* 4, subsimilar; anther-cells 2, parallel, sometimes strongly spurred at the base; pollen large (50 to 60  $\mu$  in diam.), globose, smooth, with faint spiral bands or strongly spinous. *Ovary* 2-celled, with 2 ovules in each cell; stigma of 2 equal, opposite, triangular lobes. *Capsule* globose, with a long oblong-linear beak; seeds 4, or by suppression 3 to 2, hemispheric, excavate on the plane face, wrinkled on the spheric face; sessile, not held aloft on retinacula.—**DISTRIB.** Species 100, in the warm parts of the Old World; most numerous in Africa, extending to Australia.

Sect. 1. Calyx a mere rim. Anther-cells spurred. Pollen smooth:—

- Leaves broad-oblong, entire or slightly toothed .. .. 1. *T. laurifolia*.  
 Leaves round-ovate, toothed or often lobed .. .. 2. *T. grandiflora*.

Sect. 2. Calyx of 8 to 12 teeth. Anther-cells not spurred.

Pollen spinous:—

- |                        |                                 |    |    |                         |
|------------------------|---------------------------------|----|----|-------------------------|
| Petioles not winged.   | Corolla pure white              | .. | .. | 3. <i>T. fragrans</i> . |
| Petioles often winged. | Corolla yellow, with claret eye | .. | .. | 4. <i>T. alata</i> .    |

1. *THUNBERGIA LAURIFOLIA*, Lindl. in Gard. Chron. p. 260 (1856). Scandent, up to 150 ft. long (Kurz). *Leaves* 3·5 by 1·5 in., broad-oblong, wide at base, truncate or ovate, glabrous, sub-3-nerved, entire or slightly toothed; petioles ·5 to 1 in. long. *Peduncles* axillary, solitary, distant or more often running into terminal close racemes 2 to 5 in. long; bracteoles (prophylla) 1 in. long, oblong, usually slightly pubescent. *Calyx* a mere rim. *Corolla* 2 in. long, blue or blue and white; tube campanulate, only contracted for a very short space at the base. *Stamens* 4, subsimilar; filaments glabrous; anther-cells with a rigid long spur at the base, fringed with many long pilose hairs; pollen globose, large (50  $\mu$  in diam.), smooth, with obscure broad spiral bands. *Pistil* glabrous; the two stigmatic lobes sub-opposite. *Capsule* globose, smooth, brown, ·25 in. in diam., with 4 to 2 seeds; beak 1 to 1·25 in. long, oblong-linear. *Seeds* hemispheric, cerebro-granular, excavated on the plane face. Hook. Bot. Mag. t. 4985; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 392; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 41, 42, and in Engl. & Prantl Pflanzenfam. IV. 3B, 292; Ridley in Trans. Linn. Soc. ser. 2, III. (1893) 332. *T. Harrisii*, Hook. Bot. Mag. t. 4998.

MALACCA: *Maingay* (K.D.) 1170; Thoban Isle, *Helper*; Goping, *King's Collector* 1064. PERAK: *Wray* 3145; *Scortechini* 2197; *King's Collector* 3030, 8418. PULAU MANIS: fide *Ridley*. PENANG and KEDAH: *Curtis*.—DISTRIB. Northwards to Arracan.

2. *THUNBERGIA GRANDIFLORA*, Roxb. Hort. Beng. 45 (1813 to 1814). *Leaves* ovate or rounded, 3 to 6 in. in diam., pubescent beneath, palmately 5- to 7-nerved from the base, usually angular or lobed, rarely nearly entire; otherwise as *T. laurifolia*. Roxb. Fl. Ind. III. 34; Hook. Bot. Mag. t. 2366; Nees in DC. Prodr. XI. 54 (*with all syn. except* Roxb. Cor. Pl. t. 67); Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 392; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 37, 39, and in Engl. & Prantl Pflanzenfam. IV. 3B, 292; Hemsl. in Journ. Linn. Soc. XXVI. (1890) 237; Prain Beng. Plants 796. *Flemingia grandiflora*, Rottler in Neue Schr. Gesell. Nat. Freunde IV. (1803) 202.

SINGAPORE: *Schomburgk* 84.—DISTRIB. Bengal to South China. Perhaps Schomburgk's specimen was from a cultivated plant.

This species runs excessively close to *T. laurifolia*, but Lindau has put *T. grandiflora* in a different Section because it has "flowers solitary, axillary." The inflores-

cence is exactly the same in both species; in *T. grandiflora* the flowers are very generally in terminal racemes, the upper bracts (floral leaves) being often only .25 to .5 in. long.

3. *THUNBERGIA FRAGRANS*, Roxb. Cor. Pl. I. 47 t. 67 (1795). Twining, often 4 to 8 ft. long. *Leaves* 3 by 1 to 1.5 in., oblong or elliptic, obtuse, rounded or hastate at base, nearly entire, nearly glabrous or (in form *javanica*) pubescent, sub-3-nerved; petiole .25 to .5 in. long. *Peduncles* 1 to 3 in. long, axillary, solitary, rarely two together; bracteoles (prophylla) .5 to .7 in. long, oblong-lanceolate. *Calyx* of about 12 narrow-oblong teeth .15 in. long. *Corolla* white; tube .5 to .75 in. long, narrow-oblong, contracted at top and bottom; limb of 5 obovate, emarginate, spreading lobes. *Stamens* 4, in the corolla-tube, glabrous; anthers not spurred; pollen globose (50  $\mu$  in diam.), the borders of the spiral bands carrying spines so long that the bands are obscured. *Pistil* glabrous; the 2 stigmatic lobes opposite. *Capsule* cuboid-globose, .4 in. in diam.; beak .8 in. long, oblong-linear. *Seeds* 4 (or by suppression fewer), hemispheric, cerebroid, granular, with a hole in the plane face. Nees in DC. Prodr. XI. 56; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 390 (*with all syn.*); Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 36, 38, and in Engl. & Prantl Pflanzenfam. IV. 3 B, 292; Ridley in Trans. Linn. Soc. ser. 2, III. (1893) 332, and in Journ. As. Soc. Straits 121 (Singapore 1900); Hemsl. in Journ. Linn. Soc. XXVI. (1890) 237; Prain Beng. Plants 795.

PEKAN: fide *Ridley*. — *DISTRIB.* Throughout India, extending to Timor; Philippine Islands (Palawan, *Bermijos* 193).

FORMA  *$\beta$  javanica* (sp.), Gaertn. f. Fruct. III. (1805) 22 t. 183, fig. 4; leaves beneath, petioles, and peduncles pubescent (in Wray 52, rufous shaggy). Blume Bijdr. 806; Moritz! Verz. Zollinger Pfl. 46; Hassk. Cat. Hort. Bogor. 147.

SINGAPORE: *Kunstler* 25; Ulu Kenring, *Wray* 52. KEDAH: *Curtis*. — *DISTRIB.* Throughout Malaya to North Australia.

4. *THUNBERGIA ALATA*, Sims Bot. Mag. t. 2591 (1825). Villous. *Leaves* cordate-ovate, subentire; petioles 1 to 2 in. long, often winged. *Corolla* yellow or nearly white; tube with a dark claret mouth, exactly cylindric, twice as thick as that of *T. fragrans*, otherwise resembling *T. fragrans*. Bojer Hort. Maurit. 259 (1837); Hook. Exot. Fl. III. t. 177, Bot. Mag. t. 3512; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 491; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, 37, 40, and in Engl. & Prantl Pflanzenfam. IV. 3 B, 292; Burkill in Dyer Fl. Trop. Afr. V. 9, 16; Prain Beng. Plants 795; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900).

SINGAPORE: *Kunstler* 151; *Deschamps*.—DISTRIB. Native in warm Africa and Mascarenia, a common plant; runs wild as a weed in India and South-East Asia.

## 2. NELSONIA, R. Br.

A diffuse herb. *Leaves* opposite, subequal. *Flowers* small, in dense small spikes; bracts spiral or alternate (not opposite). *Calyx* small, sub-4-lobed. *Corolla*-tube slender; limb 2-lipped. *Stamens* 2; anthers 2-celled, subincluded in the corolla-tube. *Ovary* 2-celled; ovules about 8 in each, arranged vertically in two rows on the double placental line in each cell. *Capsule* ovoid-conic, with 8 to 16 seeds in the basal half; retinacula 0.—DISTRIB. Species 1, in warm parts of Africa, India, Australia, America.

N.B.—This plant is often sorted amongst SCROPHULARIACEÆ; nor does it differ except by the arrangement of the ovules and seeds in one vertical line on the margin of the carpellary leaf.

1. NELSONIA CAMPESTRIS, R. Br. Prodr. 481 (1810). Prostrate, hairy; branches often 12 to 18 in. long. *Leaves* of stem 2 to 3 in. long, oblong or obovate, nearly entire, long-petioled or nearly sessile; basal leaves often 6 in. long. *Flowers* in small heads, .5 in. in diam.; terminal or on axillary peduncles which lengthen out in fruit to 2 to 3 in.; bracts ovate, .15 in. long; bracteoles very small. *Calyx* .125 in. long, 2-lipped; one lip deeply 3-fid, the other shortly 2-fid. *Corolla* .15 in. long, rose or white. *Pistil* glabrous; style shortly 2-fid. *Stamens* 2; anther of 2 ellipsoid cells half-divergent; pollen globose, 25  $\mu$  in diam., subtetrahedral (almost as in *Scrophulariaceæ*). *Capsule* .15 in. long; seeds ellipsoid, brown, granular. Endl. Iconogr. t. 79; Benth. Fl. Austral. IV. 543; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 394 (*with all syn.*); Burkill in Dyer Fl. Trop. Afr. V. 28; Prain Beng. Plants 797. *N. tomentosa*, Nees in Wall. Pl. As. Rar. III. (1832) 79; Nees in DC. Prodr. XI. 65; Miq. Fl. Ind. Bat. II. 770. *N. brunelloides*, O. Kuntze Revisio I. 493; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 289, t. 110, fig. c.

KEDAH: *Ridley* 8312. PENANG: *Curtis* 50, 1750; *Deschamps*. PAHANG: *Ridley* 2181.—DISTRIB. In warm regions of both hemispheres.

The innovations are often densely white-hairy; there are also often long white hairs at the base of the flower. The var.  *$\beta$  vestita*, of Fl. Br. Ind. IV. 395 (which has large leaves, up to 8 to 10 in. long, on the branches), is frequent in Lower Burma, but there is no example of it from the Malay Peninsula.

## 3. STAUROGYNE, Wall.

Undershrubs, 6 to 24 in. (rarely 3 to 4 ft.) high, at base often woody, creeping, hairy (in *S. subglabra* nearly glabrous). *Leaves* opposite, equal, simple, entire; petioles usually long, rarely short, .25 to .5 in. *Flowers* in spikes (or spike-like racemes, the pedicels up to .15 in.), dense or lax; the spikes sometimes paniced. *Bract* usually a little longer than the calyx, sometimes considerably broader; two prophylla (often alternate), linear or nearly linear, a little shorter than the bract. *Calyx* .15 to .6 in. long, divided nearly to the base into 5 narrow persistent segments (often called sepals); of these one is often longer and sometimes much broader than the others. *Corolla* .5 to 1 in. long, tubular-campanulate, rather narrow; limb of 5 short rounded segments (often colorate). *Stamens* 4 didynamous, fertile; filaments sparsely hairy, and with gland-tipped hairs near the top; anthers of 2 ellipsoid cells, ultimately divaricate; pollen globose, with three longitudinal bands not reaching the poles, 25 to 30  $\mu$  in diam. *Ovary* oblong, surrounded at base by a disk, glabrous or rarely with minute scattered hairs; style long, sometimes with a few hairs in the lower part; branches 2, unequal. *Capsule* oblong, .2 to .25 in. long, ovoid at base, acute at top, glabrous or sometimes slightly minutely hairy, 2-celled, separating loculicidally into 2 valves, bearing seeds from the base; seeds 12 to 20 in each capsule, in vertical rows on the edges of the carpellary leaves. *Seeds* attached on very small papillæ, not on retinacula, short-ellipsoid, 400  $\mu$  long, yellow-brown ultimately black, smooth, more or less reticulate, minutely pitted.—**DISTRIB.** Species 40 in South-East Asia, 10 in Brazil.

Some of the Brazil species have flowers and capsules considerably larger than in the Asiatic species. The Asiatic species are so uniform in the corolla, stamens, and pistil—even down to the hairs thereon—that these are not described for the subjoined Malay species, which are separated mainly by characters of the bracts and calyx.—The posticous stigmatic lobe (both in the type species *S. argentea*, and in some others) is occasionally somewhat 2-lobed.

*Calyx* .3 to .7 in. long :—

Sepals awned or with a stiff mucro :—

Fruit-spikes 1 to 2 in. long :—

Spike in fruit ovoid; leaves 2.5 in. long ..

.. 1. *S. setigera*.

Spike in fruit oblong; leaves up to 4 to 5 in. long ..

.. 2. *S. lanceolata*.

Fruit-spikes 2 to 3.5 in. long :—

Awn of sepals with long several-celled hairs..

.. 3. *S. malaccensis*.

Awn of sepals hardly microscopically scabrid ..

.. 4. *S. angustifolia*.

Fruit-spikes 4 to 10 in. long :—

Awn of sepals hardly microscopically hairy..

.. 5. *S. Kingiana*.

Awn of sepals with short spreading hairs ..

.. 6. *S. longifolia*.



Sepals acute, hardly awned :—

Leaves at tip acute or subacute :—

- |                                                      |    |                              |
|------------------------------------------------------|----|------------------------------|
| Spikes in fruit rather dense, often recurved ..      | .. | 7. <i>S. comosa</i> .        |
| Inflorescence of one poor terminal panicle ..        | .. | 8. <i>S. pauper</i> .        |
| Spikes in fruit long, very lax, panicked :—          |    |                              |
| Bracts and calyx with short hairs ..                 | .. | 9. <i>S. elongata</i> .      |
| Bracts and calyx viscous, with gland-tipped hairs .. | .. | 10. <i>S. lasiobotrys</i> .  |
| Leaves at tip rounded; bracts elliptic, obtuse ..    | .. | 11. <i>S. Griffithiana</i> . |

Sepals with linear obtuse tip :—

- |                                             |    |                           |
|---------------------------------------------|----|---------------------------|
| Leaves elliptic obtuse; sepals hairy ..     | .. | 12. <i>S. arcuata</i> .   |
| Leaves lanceolate-acute; sepals glabrous .. | .. | 13. <i>S. subglabra</i> . |

Calyx .125 to .175 in. long :—

Corolla .6 in. long :—

- |                                                            |                            |
|------------------------------------------------------------|----------------------------|
| Leaves with triangular obtuse tip, upper surface pubescent | 14. <i>S. merguensis</i> . |
| Leaves lanceolate-acuminate, upper surface glabrate ..     | 15. <i>S. racemosa</i> .   |
| Corolla 1 in. long .. ..                                   | 16. <i>S. macrantha</i> .  |
| Corolla .75 in. long; leaves serrulate ..                  | 17. <i>S. serrulata</i> .  |

1. STAUROGYNE SETIGERA, O. Kuntze Revisio I. 497 (1891). A weak herb, 4 to 12 in. long, often branched or decumbent. *Stem* pubescent, usually rusty upwards. *Leaves* 2.5 by .75 to 1 in.; tip triangular; base ovate or cuneate; mature nearly glabrous on both surfaces; petiole .25 to .5 in. long. *Inflorescence* of one terminal sessile head (a second on a short axillary peduncle sometimes added), ovoid, dense, .5 to .6 in. in diam., in fruit lengthening out to 1 in., rarely to 1.5 in. *Sepals* linear, very slightly unequal, the longest one .4 in. long, linear, scarcely linear lanceolate; its awn with many patent short hairs, and also long several-celled scattered hairs, but no gland-headed hairs. *Corolla* .6 in. long, from purple-pink to pink-white, nearly glabrous without in the bud. *Ovary* glabrous; style base with a few hairs. *Capsule* .2 in. long. *Ebermaiera setigera*, Nees in DC. Prodr. XI. 76; T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 398; Ridley in Trans. Linn. Soc., ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. trichocephala*, Miq. Fl. Ind. Bat. II. 774. *E. subcapitata*, C. B. Clarke in Bot. Tidskr. XXIV. 348 (Kjobenhaven 1902). *Adenosma uliginosa* var.  $\beta$  *erecta*, Nees in DC. Prodr. XI. 70; Miq. Fl. Ind. Bat. II. 771 partly (not of R. Br.).

MALACCA: *Cuming* 2355. PERAK: *Scortechini*; *Wray* 1878; Larút Perak, 500 to 800 ft., *King's Collector* 2192. GOPING: *King's Collector* 1132. PAHANG: *Ridley* 2178 (partly). SELANGOR: *Curtis* 2363; Kota Glanggi, fide *Ridley*.—DISTRIB. Common in Sumatra, also in Java, Borneo, Siam.

The dried specimens of this species are dusky green, often obscurely red-brown at top, the leaves sometimes whitened beneath. Kurz, in Journ. As. Soc. Beng. II.

78 (1870), united the three species, *S. setigera*, *S. argentea*, and *S. lanceolata*; they are undoubtedly very closely allied.

2. *STAUROGYNE LANCEOLATA*, O. Kuntze Revisio I. 497 (1891). *Stem* 6 to 14 in. high, erect, woody, undivided. *Leaves* 4 to 5 by .6 to 1 in. (or smaller), lanceolate or generally narrow-lanceolate, nearly glabrate on both surfaces. *Inflorescence* 1 in. long, in fruit 1.5 to 2 in. long, less dense than that of *E. setigera*, Nees. *Bracts*, *prophylla*, and *calyx* as of *E. setigera*, the longest sepal a trifle broader, linear-lanceolate at base. *Corolla* hairy without in the bud. *Adenosma lanceolatum*, Blume Bijdr. 756. *Ebermaiera lanceolata*, Hassk. Cat. Hort. Bogor. 147; Nees in DC. Prodr. XI. 76; Miq. Fl. Ind. Bat. II. 774 (not of C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 397). *E. longifolia*, Ridley in Trans. Linn. Soc., ser. 2, Bot. III. 332 (1893).

PAHANG: Ridley 2177, 2178 (partly). MALACCA: Derry 23.—  
DISTRIB. Java (Zollinger 591).

3. *STAUROGYNE MALACCENSIS*, C. B. Clarke. Herbaceous, 4 to 8 in. high, often branched. *Stem* hairy, often rusty at top, carrying 1 to 4, sometimes 8, spikes. *Leaves* up to 4 by 1 in., elliptic-lanceolate; base cuneate; mature with nearly glabrate surfaces; petiole .5 to 1 in. long. *Heads* 1 to 1.5 in. long, dense, in fruit lengthening to 2 to 3.5 in., lax, sometimes interrupted at base. *Bracts* oblong or elliptic-oblong, conspicuous, somewhat persistent. *Sepals* .4 in. long, conspicuously unequal, the larger one lanceolate or elliptic-lanceolate, acuminate, hardly awned, the other 4 nearly linear; tips of all the sepals with many, short, patent hairs and scattered, long, several-celled hairs. *Corolla* .6 in. long, nearly glabrous without. *Ovary* with scattered minute gland-tipped hairs in the upper half, which remain till the seeds are quite ripe. *Ebermaiera argentea*, Nees in DC. Prodr. XI. 76 (partly); T. Anders. in Journ. Linn. Soc. IX. 451 (1867). *E. lanceolata*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 397 (exclud. syn.) (not of Nees). *E. Staurogyne*, T. Anders. MS. in hb. Calcutta (not of Nees).

KEDAH and KASOOM: Curtis. PENANG: Curtis 1931. MALACCA: Griffith 189; Ridley 1636. PROVINCE WELLESLEY: Ridley 6198.—  
DISTRIB. Java; Tenasserim.

The type *Staurogyne argentea*, Wall. Pl. As. Rar. II. 80 t. 186 (1831), is the common Khasia species, remote from the present, but (as Wallich says) very near *S. angustifolia*, Wallich. *Staurogyne argentea*, O. Kuntze (and of Lindau), includes probably *S. argentea* and *S. angustifolia*, but not *S. malaccensis*.

4. *STAUROGYNE ANGUSTIFOLIA*, Wall. Pl. As. Rar. II. 81 (1831). *Stem* 8 to 12 in. long, suberect, little divided, hairy, almost woody at

the base. *Leaves* glabrate on the surface; blade 3 to 4 by .7 to 1 in., lanceolate, mostly narrowly lanceolate (but see the var. below), base attenuate, tip triangular, subacute; petiole 1 to 2 in. long. *Spikes* terminal and on short axillary peduncles, in flower ovoid or ellipsoid, dense, in fruit often 2 to 3 in. long. *Bract* narrow-oblong, aristate, with long hairs in the lower part. *Calyx* unequal, the largest sepal .6 in. long, the base narrow-lanceolate, with long hairs; the awn long, somewhat rigid, glabrous or with minute bristles (less than 40  $\mu$  long); the other 4 sepals nearly linear. *Corolla* .6 in. long, hairy without. *Capsule* .2 in. long, thicker than in the neighbouring species. *S. argentea*, O. Kuntze Revisio I. 497 *partim* (1891) (*not of* Wall.). *Ebermaiera angustifolia*, T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 398; Prain Beng. Plants 798. *E. Staurogyne*  $\beta$  *angustifolia*, Nees in DC. Prodr. XI. 75.

PERAK: Ridley 9766; Curtis. MALACCA: Goodenough 1689.—  
DISTRIB. Mergui (Falconer 860), Tavoy (Wallich 4906).

T. Anderson has written "*E. angustifolia*" on Falconer 860; but his name "*angustifolia*" (as well as Wallich 4906) may include other nearly allied forms. The true *E. Staurogyne*, Nees, is a Khasia species, in which the bract and sepals have no long several-celled hairs. This plant is put with *S. longifolia*, not with *E. Staurogyne*, by collectors. The leaves in all the examples seen have dried brown-red.

5. STAUROGYNE KINGIANA, C. B. Clarke, n. sp. *Stems* 2 to 3 ft. high, pubescent. *Leaves* glabrous; blade up to 8½ by 2 to 3 in., elliptic, narrowed at either end; main nerves 12 to 15 pair; petioles 1 to 2 in. long. *Spikes* 3 to 6 on a stem, terminal and on short axillary peduncles, 4 to 10 in. long, undivided, dense even in fruit. *Bract* linear, .8 in. long. *Sepals* 5, nearly equal, linear, longest up to .75 in. long, very little dilated at the base, sparsely hairy at base, glabrous or minutely scabrous in the upper half. *Corolla* 1 in. long, "yellowish-white, lower lip pale red" (collector's note), glabrous without. *Stamens* and pollen of the genus. *Pistil* glabrate. *Capsule* .2 in. long, rather thick; the endocarp much thickened, almost corky. Allied to *S. angustifolia*, T. Anders.

PERAK: on limestone hills, 500 to 800 ft. alt., *King's Collector* 10704; Goenong Panti, *King's Collector* 208. PAHANG: Ridley 2176.

6. STAUROGYNE LONGIFOLIA, O. Kuntze Revisio I. 497 (1891). Sub-erect, 8 to 30 in. high, hairy. *Stem* (in large examples) woody, robust below, and with erect branches. *Leaves* glabrous on the upper surface; blade 5 by 1 in., lanceolate, attenuate at either end (in the type example, but the leaves are frequently longer, and there are examples with shorter, broader leaves); petiole 1 to 1.5 in. long. *Spikes* short-peduncled at the end of branches and in the axils, short-oblong (often nodding) when

young, in fruit 2 to 5 in. long, somewhat dense, erect. *Bract* and *calyx* softly hairy, without long, fine, several-celled hairs; bract narrow-lanceolate, aristate, .6 in. long; sepals all linear, the longest one .5 in. long, including its awn .16 in. long, the awn hairy to the tip with spreading hairs varying in length, but all short. *Corolla* long, hairy without; tube nearly white, segments and mouth pink to purple. *Pistil* glabrate. *Stamens* and pollen of the genus. *Capsule* .2 in. long. Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 288. *Ebermaiera longifolia*, Nees in DC. Prodr. XI. 76; T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 399; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893).

MALACCA: *Cuming* 2350; *Lemann*; *Griffith* (K.D.) 6079; *Hullett* 403. PERAK: *Scortechini* 155; *Wray* 1302; *Ridley* 1604; alt. 300 to 800 ft., *King's Collector* 5821, 8678. SELANGOR: *Ridley* 7590. NEGRI SEMBILAN: *Ridley* 10098. PAHANG: Tahan, fide *Ridley*.

This species is very close both to *S. angustifolia* and to *S. comosa*; the former differs by having the awns of the sepals glabrous or microscopically scabrous; the latter differs in that the sepals have lanceolate-linear soft tips, hardly awns.

7. STAUROGYNE COMOSA, O. Kuntze Revisio I. 497 (1891). *Stem* 1 to 3 ft. high, almost woody below, hairy. *Leaves*: blade up to 8 by 3 to 3.5 in., cuneate at either end; upper surface glabrous, obscurely minute-granular-tuberculate; petiole 1 to 2.5 in. *Spikes* short, peduncled, undivided, dense, in flower 1 to 4 in. long, nodding, in fruit up to 5 to 7.5 in. long, often deflexed, rather dense (scarcely interrupted at base), softly hairy. *Bract* and *sepals* softly hairy, with long several-celled hairs; bract .4 in. long in Wallich's type (often longer), lanceolate-acuminate, point linear (hardly awned), with soft white hairs; sepals .3 in. long in Wallich's type (often longer), the longest (wider than the others) lanceolate with a linear soft-hairy tip. *Corolla* in the bud densely clothed with deflexed hairs without. *Pistil* glabrous. *Stamens* and pollen of the genus. *Capsule* .2 in. long. Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 288. *Ruellia* ? *comosa*, Wall. Cat. 2414. *Ebermaiera axillaris*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 75; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 399.

PENANG: *Wallich* 2414. PERAK: *Scortechini* 777; *Wray* 2192; *Ridley* 2893; 500 to 800 ft., *King's Collector* 10705; Larut, 100 ft., *King's Collector* 1834. SELANGOR: (*Ridley*) 7589, 8543, 10546.

*King's Collector* notes the calyx "velvety claret-coloured," the corolla "blue-white, darker inside." The corolla seems caducous, as the large well-collected material provides buds and fruit only. The type examples of Wallich from Penang

are unusually small specimens. This species is generally distinguishable from *E. longifolia*, Nees, by its much broader (elliptic) leaves.

8. *STAUROGYNE PAUPER*, C. B. Clarke, n. sp. *Stem* 18 in. long, undivided, glabrate, decumbent, woody at base. *Leaves* glabrate, with few scattered, white, adpressed bristles on the upper surface; blade 4·5 by 2 in. long, elliptic-lanceolate, acuminate, acute; base cuneate; petiole 25 to 5 in. long. *Inflorescence* of one terminal poor panicle, 3 by 1½ in., with few distant flowers; bracts 5 in. long, linear, soft, not awned. *Sepals* subequal, 5 in. long, linear, with soft hairs and many gland-tipped hairs. *Corolla* 6 in. long, pubescent without, "pale yellow with dark stripes" (King's Collector). *Pistil* of *Staurogyne*, glabrous except a few small hairs in the lower part of the style.

PERAK: alt. 200 ft., *King's Collector* 2832.

9. *STAUROGYNE ELONGATA*, O. Kuntze Revisio I. 497 (1891). Slightly hairy. *Leaves* glabrate; blade 6 by 2 in., oblong-elliptic, cuneate at either end; nerves 8 to 10 pair, thin; petiole 2 to 3 in. long. *Spikes* up to 4 to 7 by 1 in., panicle, lax; pedicels often 175 in. long, with alternate prophylla. *Bracts* nearly 5 in. long, lanceolate-linear, with short white hairs, no gland-tipped hairs. *Sepals* 5, linear, the longest nearly 5 in. long, slightly widened at base. *Corolla* (buds) 4 in. long, scarcely pubescent without. *Capsule* 2 in. long, the upper half with scattered minute hairs. Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 288. *Adenosma elongatum*, Blume Bijdr. 757. *Erythracanthus elongatus*, Nees in DC. Prodr. XI. 78, var.  $\beta$  excl. *Ebermaiera elongata*, Nees in DC. Prodr. XI. 721, var.  $\beta$  excl.; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400 (not of Miquel).

PENANG: Wallich (*fide* T. Anderson).—DISTRIB. Java.

The var.  $\beta$  of Miquel (here excluded) is *Ebermaiera debilis*, T. Anders. (in Journ. Linn. Soc. IX. 452, in note (1867)), a weak Philippine species. *E. elongata*, Miquel (Fl. Ind. Bat. II. 775), was (so Miquel says) = *E. Griffithiana*, T. Anders.; and, from Miquel's description, it must have been largely (or wholly) that species. As to *E. subpaniculata*, Hassk. (Retzia I. 77 (1855)), there are now here examples both of the Salak wild plant and of that cultivated at Buitenzorg; they may be varieties of *E. elongata*, Nees, but do not match it. The above description of *E. elongata*, Nees, is wholly from the Java type plant; no example from Penang has been seen.

10. *STAUROGYNE LASIOBOTRYS*, O. Kuntze Revisio I. 497 (1891). *Stem* 18 to 20 in., suberect, hairy. *Leaves* glabrate; blade 5 by 1·5 in., oblong or elliptic-lanceolate, cuneate at either end, thin; petiole 1 to 3 in. long. *Spikes* up to 4 to 6 by 1 in., panicle, lax, softly viscous-hairy; pedicels often 16 in. long. *Bracts* 35 in. long, linear, with several-celled hairs ended by a coloured gland. *Sepals* 5, linear, the longest 35 in.

long, with several-celled gland-tipped hairs. *Corolla*, *stamens*, *capsule* as of *S. elongata*. *Ebermaiera lasiobotrys*, Nees in DC. Prodr. XI. 721; Wall. Cat. 9084; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400.

PERAK: Curtis 1350; *King's Collector* 8370 ("Flower dark-red tipped with pink"); Larút, 500 to 1000 ft., *King's Collector* 2292. SELANGOR: Ridley 7588.—DISTRIB. Moulmein, Mergui, Tavoy.

11. STAUROGYNE GRIFFITHIANA, O. Kuntze Revisio I. 497 (1891). *Stem* 4 to 8 in. long, creeping at base. *Leaves* (mature) shortly rather dense hairy on the upper face; blade 5·5 by 3 in. in Griffith's type (often smaller), roundly elliptic, very obtuse; base rounded or cordate (but cuneate in many examples); petiole ·5 to 2 in. long. *Inflorescence* simple or branched; main spike 6 in. long in Griffith's type, lax, only slightly hairy. *Bracts* up to ·5 in. long, elliptic, rounded, obtuse at top. *Sepals* 5, the longest ·4 in. long, linear; tip linear-acute, not awned, with sparse short several-celled hairs not gland-tipped. (In the Perak example the sepals are linear-ligulate-obtuse at the tip.) *Corolla* ·6 in. long, white, rarely tinged pink. *Capsule* ·2 in. long. *Erythracanthus Griffithianus*, Nees in DC. Prodr. XI. 78. *E. obtusus*, Wight Ic. t. 1491 (not of Nees). *Ebermaiera Griffithiana*, T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. elongata*, Miq. Fl. Ind. Bat. II. 775 (mainly).

MALACCA: Griffith (K.D.) 6078; Goodenough 1509. SINGAPORE: Ridley; Hullett 613; G. King. PAHANG: Ridley 2175. PERAK: alt. 600 to 1000 ft., Scortechini 40; *King's Collector* 10335. PAHANG: at Tahan, fide Ridley.

12. STAUROGYNE ARCUATA, C. B. Clarke, n. sp. *Stem* 4 to 8 in. long, villous, woody, creeping. *Leaves* with scattered hairs above or glabrate; blade 4·5 by 2·5 in., ovate elliptic, tip triangular obtuse; base cuneate or sometimes rounded; petiole ·5 to 1·5 in. long. *Spikes* often 2 or 3, lax, 2 to 4 in. long, arcuate in fruit; bracts linear or sublanceolate, ·5 in. long, hairy. *Sepals* subequal, ·5 in. long, linear or very narrow-ligulate, hairy, tip subobtuse. *Corolla* ·6 in. long, pubescent without, red (Wray). *Capsule* ·2 in. long.

PERAK: Scortechini 456, 728; Wray 48, 694; Ridley 2892.

13. STAUROGYNE SUBGLABRA, C. B. Clarke, n. sp. Nearly glabrous. *Stem* 6 to 12 in. *Leaves* glabrous, the upper surface sometimes obscurely puberulous; blade 4·5 by 1 to 1·25 in., lanceolate or broad-lanceolate, subacute; base cuneate; petiole ·5 to 1 in. long. *Spikes* often 2 to 4, very loose, up to 3 to 5 in. long; the rachis microscopically scabrous;

bracts .5 in. long, linear, or the lower ones oblong. *Sepals* subequal, .5 in. long, linear, or scarcely oblong-linear, subobtuse, glabrous, almost shining. *Corolla* .6 in. long, very white (King's Collector). *Capsule* .2 in. long.

PERAK: *Scortechini* 5386, 406; *Ridley* 5514; *Curtis*, alt. 3500 to 4000 ft.; *King's Collector* 8427.

This species is very similar to *E. arcuata* in all essential points; the two characters of hairy sepals with elliptic obtuse leaves, and glabrous sepals with lanceolate leaves, are, however, concomitant throughout the ample material.

14. STAUROGYNE MERGUENSIS, O. Kuntze Revisio I. 497 (1891). *Stem* 4 to 8 in. long, creeping at base, pubescent. *Leaves* minutely pubescent on the upper surface; blade up to 5 by 2.5 in. (much smaller in Helfer's type); tip obtusely triangular; base nearly always cordate; petiole .5 to 1.5 in. long. *Spikes* usually peduncled, often paniculate, 2 to 3 in. long, very lax, thin. *Bracts* scarcely .25 in. long, linear-lanceolate or linear. *Sepals* 5, subequal, united at the base, .125 to .175 in. long, linear, hispid. *Corolla* .6 in. long, light blue or violet and white, pubescent without. *Capsule* .25 in. long. *Ebermaiera merguensis*, T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 402.

PERAK: *Wray* 3966; *Scortechini* 285, 1356, alt. 400 to 600 ft.; *King's Collector* 8284; *Wray* 4158. TRANG: *Goldham*. KEDAH: *Curtis*. —DISTRIB. Mergui.

This species in habit much resembles *E. incana*, and there is little to separate it except the small bracts; the hairs on the upper surface of the mature leaves are similar but smaller.

15. STAUROGYNE RACEMOSA, O. Kuntze Revisio I. 497 (1891). *Stem* 1 to 2 ft. high, pubescent, creeping at base. *Leaves* glabrate, usually drying a red-brown; blade 4 by 1.25 in., broadly lanceolate, acuminate at either end; petiole .5 to 1.5 in. long. *Spikes* usually peduncled, simple or paniced, pubescent, up to 3 to 5 in. long, very lax; pedicels distant, exceedingly short; bracts lanceolate, hairy, .175 in. long. *Calyx* of 5 equal lanceolate lobes, .175 in. long. *Corolla* .6 in. long, white, tipped rose or purplish, pubescent without. *Capsule* .2 in. long, broad-oblong. T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 401; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 288. *Ruellia racemosa*, Roxb. Fl. Ind. III. 42. *Ebermaiera racemosa*, Miq. Fl. Ind. Bat. II. 775. *Erythranthus racemosus*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 78.

PENANG: *Wallich* 2336; *Stoliczka*; *Deschamps*; *Hullett* 124; *Maingay* (K.D.) 1173; alt. 2000 ft., *King's Collector*; *Curtis* 406. MALACCA:

*Griffith*. SINGAPORE: *Walker* 197. INDRAGERI: *Curtis*. — **DISTRIB.** Moulmein.

16. *STAUROGYNE MACRANTHA*, C. B. Clarke, n. sp. *Stem* 3 to 4 ft. long, villous. *Leaves* glabrous, with a very few remote hairs on the upper surface; blade 4.5 by 1.75 in., elliptic-lanceolate, subacute; base cuneate; petiole .25 to 1 in. long, villous. *Peduncles* two, penultimate, 3 in. long, villous, carrying small few-flowered panicles; bracts .2 in. long, linear, very hairy. *Sepals* subequal, .175 in. long, linear, very hairy. *Corolla* 1 in. long, pubescent without.

PERAK: at Larút, alt. 4500 to 5000 ft., *King's Collector* 2417.

17. *STAUROGYNE SERRULATA*, C. B. Clarke, n. sp. *Stem* elongate, villous upwards. *Leaves* 4 to 5 by 1.75 in., elliptic, acuminate at either end; margin closely serrulate; both surfaces slightly pubescent; petiole .5 to 1 in. long, villous. *Peduncles* 4, from the penultimate axils, 4 in. long, villous; inflorescence 12- to 18-flowered, lax, pubescent; bracts hardly .125 in. long, linear. *Calyx* .125 in. long. *Corolla* .75 in. long, white, nearly straight, but the pedicels bent close under the calyx, so as to bring the corollas horizontal.

PERAK: Ulu Batang Padang, *Wray* 1599; *Scortechini*.

#### 4. *CARDANTHERA*, Voigt.

**Herbs.** *Leaves* opposite; upper toothed, rarely entire; lower frequently pinnatifid. *Flowers* in axillary clusters (in non-Malayan species running into terminal inflorescences); bracts and prophylla often obscure or 0. *Sepals* narrow, often unequal. *Corolla* nearly straight; tube shorter than the calyx; limb 2-lipped; lobes contorted in the bud. *Stamens* 4, fertile; anther-cells oblong; pollen globose, small, with numerous striæ converging to the poles. *Capsule* sessile, narrow, seed-bearing from the base. *Seeds* 30 to 100, on small, straight, conic, soft funicles, hardly to be called retinacula (*i. e.* curved, rigid, pointed), glabrous or slightly glandular, *i. e.* not clothed with hygroscopic hairs. — **DISTRIB.** Species about 8 in India, 2 in Africa.

This genus should, according to Slater, be placed in the same Subfamily with *Staurogyne*, the pollen being identical in the two genera.

*CARDANTHERA TRIFLORA*, Voigt Hort. Sub. Calc. 482 (1845). Pubescent, decumbent. *Branches* up to 1 ft. long. *Leaves* ovate, crenate-serrate, the lower (when in water) often pinnatifid. *Flowers* 1 to 3 in the axils; bracts .3 to .35 in. long, obovate; prophylla .25 in. long, oblong. *Sepals* linear, unequal, about as long as the bract. *Corolla* .35 to .5 in. long, purple and white. *Capsule* .25 to .35 in., pubescent; style thinly hairy. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 405. *Ruellia triflora*,



Roxb. Hort. Beng. 46, and Fl. Ind. III. 52. *Adenosma triflora*, Nees in Wall. Pl. As. Rar. III. 79, and in DC. Prodr. XI. 68; T. Anders. in Journ. Linn. Soc. IX. 454 (1867).

SINGAPORE : *fide* C. B. Clarke (in Hook. f. l. c.).—DISTRIB. Abundant in Bengal, extending to Pegu.

I do not find now in the Kew Herbarium any example of this from Singapore; it is nearly sure to grow in the Malay Peninsula.

## 5. HYGROPHILA, R. Br.

Herbs, attaining 1 to 5 ft. high, more or less hairy. *Stems* quadrangular. *Leaves* opposite, equal, entire or crenate; the upper surface full of raphides. *Flowers* in continuous spikes or axillary clusters. *Calyx* .25 to .5 in. long, with 5 acute teeth, the lower half tubular in the bud, often with 5 lines of very thin tissue, and split deeply in the fruit; or 4-fid in *H. spinosa*. *Corolla* distinctly 2-lipped; lower lip trifid, the middle segment broader, emarginate. *Stamens* 4, didynamous, subsimilar, fertile (except in *H. polysperma*, where the two lower are filaments only or nearly obsolete); filaments glabrous or nearly so; anthers of two parallel subequal muticous cells; pollen globose, 15 to 35  $\mu$  in diam., with 12 to 18 longitudinal ribs. *Ovary* oblong, with 8 to 80 ovules; upper part of ovary and style more or less hairy; style with one linear branch, the other reduced to a small rudiment. *Capsule* .25 to .5 in. long, linear-oblong, seed-bearing from the base; seeds 8 to 80, ovoid, flat, 50  $\mu$  in diam., brown, nearly smooth on faces, shaggy, with hygroscopic hairs on margin.—DISTRIB. Species 40, in the warmer parts of the globe; these fall into three well-marked subgenera, the species of each of which are so closely allied as to be esteemed subspecies only by some competent botanists.

Subgenus 1. HEMIADELPHIS (genus), Nees. Unarmed. Flowers in terminal spikes :—

Fertile stamens 2 :—

Bracts oblong or elliptic, as long as the calyx .. 1. *H. polysperma*.

Subgenus 2. EUHYGROPHILA. Unarmed. Flowers in distant axillary clusters :—

Leaves lanceolate acute or linear :—

Flowers in dense axillary clusters .. .. 2. *H. angustifolia*.

Axillary clusters small, often 3- to 1-flowered .. .. 3. *H. saxatilis*.

Leaves obovate or oblong, triangular or obtuse at tip :—

Leaves oblong, all sessile or nearly so .. .. 7. *H. subsessilis*.

Leaves, or at least lower leaves, petioled :—

Corolla .25 to .35 in. long .. .. 5. *H. meianthos*.

Corolla .5 to .8 in. long :—

Capsule .75 to .8 in. long. Calyx sparingly hispid .. 4. *H. quadrivalvis*.

Capsule .7 in. long. Calyx densely hispid .. 6. *H. phlomoides*.

Subgenus 3. *ASTERACANTHA* (genus), Nees. Each whorl of axillary flowers with some strong spines, often an inch long, round it :—

Leaves sessile. Corolla 1 in. long .. .. 8. *H. spinosa*.

1. *HYGROPHILA POLYSPERMA*, T. Anders. in Journ. Linn. Soc. IX. 456 (1867). Small, procumbent, divided, sparingly pubescent. *Leaves* 1 by .5 in., oblong or elliptic, nearly entire; base narrowed or shortly petioled; upper surface full of raphides. *Spikes* terminal, 1 to 2.5 in. long, rather dense; bracts .25 to .35 in., elliptic; prophylla .25 in., lanceolate. *Calyx* .25 in., divided nearly to the base; segments 5, linear, pubescent. *Corolla* .35 in. long, slender, pubescent, pale blue or white. *Stamens* 2; the two posticous filaments without anthers, sometimes nearly obsolete; anther-cells 2, oblong; pollen 25  $\mu$  in diam., globose, with 12 to 16 longitudinal ribs. *Ovary* hairy towards the top; style hairy; stigma of one linear and one suppressed branch. *Capsule* .25 to .35 in. long, oblong, hairy towards the top. *Seeds* 20 to 32, orbicular, 40 to 50  $\mu$  in diam., flattened, brown, shaggy on the margin with hygroscopic hairs. Boiss. Fl. Orient. IV. 519; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 406; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297; Prain Beng. Plants 801. *Justicia polysperma*, Roxb. Hort. Beng. 3, and Fl. Ind. I. 119. *Hemiadelphis polysperma*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 80; Wight Ill. t. 164 B, fig. 3, and Ic. t. 1492; Griff. Notul. IV. 135; Miq. Fl. Ind. Bat. II. 776.

MALACCA : Griffith. —DISTRIB. Common throughout India; Kabul ; Tonkin.

2. *HYGROPHILA ANGUSTIFOLIA*, R. Brown Prodr. 479 (1810). *Stems* 2 ft. high, often decumbent at base. *Leaves* .3 by .7 in., lanceolate, attenuate at either end, subentire, glabrate; upper surface with many raphides; petiole .25 in., sometimes .5 in. long. *Flowers* in distant axillary dense clusters; bract .25 to .35 in. long, elliptic; prophylla scarcely .25 in. long. *Calyx* .35 to .5 in. long; lobes in flower hardly half as long as the tube, triangular-linear, densely clothed with conspicuous raphides, sparsely hispid or nearly glabrous. *Corolla* .5 to .7 in. long, pale purple. *Stamens* 4, fertile; anther-cells 2, oblong, muticous, at equal height; filaments glabrous; pollen 25  $\mu$  in diam., globose, with 12 to 16 longitudinal ribs. *Style* hairy; stigma of the genus. *Capsule* .5 to .7 in. long, a little exceeding the calyx, 20- to 28-seeded. Nees in DC. Prodr. XI. 91; Benth. Fl. Austral. V. 545; Ridley in Trans. Linn. Soc. ser. 2, III. 333 (1893). *H. salicifolia*, Nees in Wall. Pl. As. Rar. III. 81, and in DC. Prodr. XI. 92; Wight

Ic. t. 1490; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 407; Hemsl. in Journ. Linn. Soc. XXVI. 237 (1890); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900); Prain Beng. Plants 801. *H. lancea*, Miq. in Ann. Mus. Bot. Lugd.-Bat. II. 123 (1865-66). *Ruellia salicifolia*, Vahl. Symb. III. 84; Roxb. Fl. Ind. III. 50.

SELANGOR: *Curtis* 2365. PAHANG: *Ridley* 1213. PEKAN and KELANTAN: fide *Ridley*.—DISTRIB. From South India to China and Japan.

The description above is taken from Wall. Cat. 2373A, which is Nees' "type" of *Hygrophila salicifolia*. The Selangor example differs from this in having the capsules .8 in. long, in which point it resembles *H. quadrivalvis*, Nees, below. T. Anderson esteemed the whole of the species in the present section to constitute but one polymorphic species (Journ. Linn. Soc. IX. 456 (1867)). They are described here shortly only, with reference to their differences from *H. salicifolia*, Nees, taken as the standard form.

3. *HYGROPHILA SAXATILIS*, Ridley in Trans. Linn. Soc. ser. 2, III. 333 (1893). Small, rigid, branched, 6 to 14 in. high. *Leaves* approximated, 1 to 1.5 by .175 to .2 in., linear, entire, nearly glabrous. *Flowers* in small axillary clusters, usually only 3 to 1 together. *Corolla* .35 to .5 in. long, hardly smaller than that of *H. salicifolia*, white without, violet within. *H. pusilla*, Blume Bijdr. 804?

PAHANG: *Ridley* 2179. PERAK: *Scortechini*; alt. 300 ft.; *Wray* 3319, 3489; *Curtis*.—DISTRIB. Ceylon (Thwaites 3109); Borneo; Philippines.

4. *HYGROPHILA QUADRIVALVIS*, Nees in Wall. Pl. As. Rar. III. 80 (1832). *Stems* stout, often 3 to 4 ft. long. *Leaves* with an obovate triangular or obtuse tip; obovate rather than lanceolate, often crenulated in the upper half. *Calyx* exactly as of *H. salicifolia*. *Corolla* .7 to .8 in. long. *Capsule* .75 to .8 in. long, often numerous in the whorl, very erect. Nees in DC. Prodr. XI. 89; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900); Prain Beng. Plants 801, 802. *H. obovata*, Wight Ic. t. 1489.

PENANG: *Deschamps*; *Curtis* 1757; Durian S.B., *King's Collector* 368 (flowers white). MALACCA: *Griffith*; *Maingay* 1979 (Kew 1178). SINGAPORE: *Lobb* 57; *Kurz*; *Hullett* 231. PERAK: *Scortechini* 64, 84, in salt swamps; *Wray* 2506; Mekong, *Scortechini* 1099; Durian S.B., *King's Collector* 364.—DISTRIB. India, common, especially near the sea; Java, Borneo, Tonkin.

5. *HYGROPHILA MEIANTHOS*, C. B. Clarke, n. sp. *Leaves* obovate, 2 in. long, nearly glabrous. *Bract* less than .25 in. long, oblong. *Calyx*

·25 in. long, divided half-way down; teeth sparsely white-hispid. *Corolla* (expanded) ·25 to ·35 in. long. *Anthers* small, round. *Capsule* scarcely ·35 in. long. *H. salicifolia* var. *assurgens*. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 407 (*partly*).

MALACCA: *Maingay* 3002 (K.D. 1177).

The examples are good with numerous flowers and ripe fruits, and appear "normal" in all respects.

6. *HYGROPHILA PHLOMOIDES*, Nees in Wall. Pl. As. Rar. III. 80 (1832). *Stems* often very hairy. *Leaves* 2 to 4 in. long, obovate; tip triangular, rarely subacute. *Calyx* divided half-way down; teeth densely white-hispid, so that the whorls resemble somewhat those of *Phlomis*; otherwise as *H. quadrivalvis*. Miq. Fl. Ind. Bat. II. 779. *H. phlomoides*, Nees in DC. Prodr. XI. 90; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408; Prain Beng. Plants 801, 802. *H. hirsuta*, Roxb. Fl. Ind. III. 51. *H. phlomoides*, Wall. Cat. 2376.—Rheede Hort. Mal. II. 89, t. 46.

PENANG: *Deschamps*. SINGAPORE: *Ridley* 3612A. SELANGOR: *Ridley* 8547, 10499. PERAK: *Scortechini* 620, 1106, alt. 200 ft.; *Wray* 1748, 2432.—DISTRIB. India (common), Tonkin, Borneo.

VAR.  $\beta$  *Roxburghii*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408. Smaller, often procumbent and more divided. *Leaves* 1 to 2 in. long, often scabrid, pubescent. Prain Beng. Plants 801, 802. *H. obovata*, Griff. Notul. IV. 134 (*not exactly that of Nees*). *Ruellia obovata*, Roxb. Fl. Ind. III. 51.

PENANG: *Deschamps*.—DISTRIB. Chittagong, Pegu, Mergui, Philippines.

I do not see how this var. differs from *H. radicans*, Nees in Wall. Pl. As. Rar. III. 81, and in DC. Prodr. XI. 92.

7. *HYGROPHILA SUBSESSILIS*, C. B. Clarke, n. sp. *Stem, leaves* and *inflorescence* with brown hairs. *Leaves* 1·5 by ·4 in., oblong, obscurely obovate; tip triangular; base narrowed; nerves beneath conspicuous; petiole, even in the lower leaves, 0 or hardly any; otherwise as *H. salicifolia*.

MALACCA: *Harvey*.

This resembles some forms of *H. undulata*, Blume, in which, however, the brown hairs are not present, and the lower leaves are petioled.

8. *HYGROPHILA SPINOSA*, T. Anders. in Thwaites Enum. Pl. Zeyl. 225 (1864). *Stems* stout, 2 to 5 ft. high. *Leaves* 3 to 6 in. long, lan-

ceolate to linear, hispid, sessile. *Flowers* clustered in the axils, 4 to 6 of the outer bracts being strong spines an inch long. *Bract* .5 to 1 in. long, lanceolate. *Calyx* .35 to .5 in. long, divided nearly to the base into 4 lanceolate lobes, one of which is broader and sometimes emarginate. *Corolla* 1 in. long, pale purple. *Anthers* and pollen of the genus. *Capsule* .35 in. long, linear-oblong, 4- to 8-seeded from the base. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409; Burkill in Dyer Fl. Trop. Afr. V. 31; C. B. Clarke in Dyer Fl. Cap. V. 11 (*with all syn.*); Prain Beng. Plants 802; *H. longifolia*, Kurz in Journ. As. Soc. Beng. 1870, II. 78 (*non* Nees). *Asteracantha longifolia*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 247; Wight Ic. t. 449; Miq. Fl. Ind. Bat. II. 811; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297. *A. auriculata*, Nees in DC. l. c. 248.

SINGAPORE: *King's Collector* 249.—DISTRIB. Abundant in India and Africa.

*Hygrophila longifolia*, Nees (in Mart. Fl. Brasil, IX. 22 (1847)), is a totally different plant; for this cause T. Anderson, when he transferred *Asteracantha longifolia* to *Hygrophila*, gave it the new name *H. spinosa*. Nevertheless, some botanists call the Asiatic *Asteracantha* by the name *H. longifolia*, thereby causing great confusion.

## 6. NOMAPHILA, Blume.

Inflorescence in numerous 1-sided, open, axillary racemes shorter than the leaves. *Bract* (and prophylla) inconspicuous, linear, or wanting. *Calyx* even in the bud deeply divided (two-thirds or three-fourths of the way down) into 5 lobes. Otherwise as *Hygrophila*.—Species 14, *viz.* 8 in South-east Asia, very closely allied, and 6 in Tropical Africa.

This genus is in essentials *Hygrophila*, and is sunk in *Hygrophila* by both Lindau and Burkill, but is easily distinguished from it, whether estimated a genus or a subgenus.

1. *NOMAPHILA STRICTA*, Nees in DC. Prodr. XI. 84 (1847). Nearly glabrous, drying a black-green. *Stems* 3 ft. *Leaves*: blade 3 to 4.5 in. long, narrowly elliptic, attenuate at either end; midrib beneath with fine patent hairs; petioles up to 2 to 3 in. long. *Corymbs* in many axils, 2 to 4 in. in diam., recurved in fruit; peduncles less than 1 in. long; pedicels nearly glabrous; bract and prophylla linear, inconspicuous or 0. *Calyx* .25 to .35 in. long, divided nearly to the base; segments 5, linear, glabrous or minutely scabrous or hispid (not viscid or glandular-hairy). *Corolla* .5 in. long or more, bright blue. *Filaments* glabrous; pollen 20  $\mu$  in diam., globose, with 12 to 16 longitudinal ribs. *Ovary* and style pubescent. *Capsule* .35 to .6 in. long;

seeds small, ovoid, flattened, brown, shaggy on the margin, with hygroscopic hairs. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409. *Justicia stricta*, Vahl Symb. II. 6. *Cryptophragmium axillare*, Nees in DC. Prodr. XI. 96, cf. Vidal Phanerog. Cuming. Philipp. 61 *in nota*, 132. *Hygrophila stricta*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 297 (*non* Hassk.).

PERAK: King's Collector 367; Curtis 3152; Wray 4256; *Scortechini*.  
JOHORE: Ridley 4173, 11133.—DISTRIB. Borneo, Philippines.

Nees himself, in DC. Prodr. XI. 722, united this species to *N. corymbosa*, Blume Bijdr. 804 (1825); the latter is (when dried) a smoky grey-green; the pedicels and calyx have viscous (and often glandular) hairs. The two are very close together.

2. *NOMAPHILA MINOR*, C. B. Clarke, n. sp. Smaller in all its parts than *N. stricta*. *Leaves*: lamina scarcely 2 in. long. *Corymb*-branches slender, glabrate. *Corolla* .25 to .35 in. long. *Anthers* and pollen smaller. *Capsule* .25 to .35 in. long. *N. stricta* (*partim*), C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409. *Ruellia* ? *paniculata*, Herb. Rottler.

PERAK: *Scortechini* 1374.—The example in Herb. Rottler is without locality.

## 7. RUELLIA, Linn.

Herbs or undershrubs. *Leaves* opposite, subequal, entire; upper surface with raphides. *Flowers* axillary (or panicled in American species); bract 0; prophylla spatulate or subfoliaceous, exceeding the calyx. *Calyx* deeply 5-fid; segments subequal, linear. *Corolla* tubular-ventricose, blue to white; lobes rounded, twisted to the left in the bud. *Stamens* 4, didynamous; filaments glabrous; anthers of 2 oblong, subequal, parallel, muticous, glabrous cells; pollen globose, large (30 to 50  $\mu$  in diam.), honeycombed. *Ovary* glabrous; ovules 3 to 10 in each cell; style hairy, with one linear branch, the other obsolete. *Capsule* clavate; base solid, sterile; top ellipsoid or subglobose, with 6 or more close-packed seeds; retinacula large, hooked. *Seeds* ovoid, flattened, hygroscopically shaggy on margin.—Species 150 (Bentham) or 200 (Lindau), in the warmer parts of the world, more abundant in America.

But a considerable number of the species reckoned in *Ruellia* by Lindau have not "wabenpollen" (honeycombed pollen), but "stachelpollen" (prickly pollen); so that the species left in *Ruellia* may not be more than 120 to 150, and possibly may be much fewer, if (as in the above diagnosis) the genus is restricted to those plants which have a stalked clavate capsule [*Dipteracanthus* (genus), Nees].

1. *RUELLIA REPENS*, Linn. Mant. 89 (1767) (*not of* Burm.). Sparingly hairy or glabrate. *Stem* 6 to 20 in., weak, often much branched.

*Leaves* 1 by .35 to .5 in., lanceolate, nearly always narrowed at the base, entire; upper surface sprinkled with raphides; petiole .125 to .2 in. *Flowers* axillary, mostly solitary; bract 0; prophylla spatulate or foliaceous, exceeding the calyx. *Calyx* .2 in. long, divided nearly to the base into 5 subequal linear segments. *Corolla* .75 in. long. *Capsule* .5 in. long, contracted, sterile at the base; the seeds (usually 5 to 8) imbricated near the top. Blume Bijdr. 794; T. Anders. in Journ. Linn. Soc. IX. 460 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 412; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893); Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 310; Hemsl. in Journ. Linn. Soc. XXVI. 238 (1890); Ridley in Journ. As. Soc. Straits, 121 (Singapore 1900). *Dipteracanthus lanceolatus*, Nees in Wall. Pl. As. Rar. III. 82, and in DC. Prodr. XI. 124; Miq. Fl. Ind. Bat. II. 782. *D. subdenticulatus*, Miq. ! Journ. Bot. Néerl. I. 117 (1861). *Rostellularia sarmentosa*, herb. Buitenz. ! (non Nees).

PENANG: *Curtis* 1876. MALACCA: *Griffith*. SINGAPORE: *Lobb*; *T. Anderson*; *Hullett*; *Ridley* 2698, 10725. KEDAH: *Ridley* 5750. PAHANG: fide *Ridley*. PERAK: *Scortechini* 1283.—DISTRIB. A common Malay plant, extending to Tenasserim on one side, to China and the Philippines on the other.

The plate of Burmann (Fl. Ind. t. 41, fig. 1) is good, and represents a plant not of the genus *Ruellia*. In the Addit. to Mant. 515 (1771), Linnæus says his *Ruellia repens* was Burmann, t. 41, fig. 1; it may be more correct to call this species *R. repens*, Blume. Nees, in DC. Prodr. XI. 370, says his *Rostellularia sarmentosa* had the capsule "4-seeded from the base," so that there is probably some error in the *Rostellularia sarmentosa* issued from Buitenzorg.

VAR.  $\beta$  *linearis*, C. B. Clarke. *Leaves* 2.25 by .2 to .25 in.

PAHANG: *Ridley* 2182. IPOH: *Deschamps*.

*Ruellia prostrata*, Lam. Encycl. VI. 349 (cf. Hook. f. Fl. Br. Ind. IV. 411), differs a little from *R. repens*, Linn., by having larger flowers and capsules, and the leaves usually rather larger. In the Kedah example, *Ridley*, n. 5750, the flowers are more than 1 in. long, and the capsules more than .75 in. long; and *Ridley* has issued it as "*R. prostrata*"; the habit and small leaves are typical *R. repens*.

[*R. angustiflora*, Benth. & Hook. f. Gen. Pl. II. 1079 (*R. angustifolia*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 311), is a large-flowered American *Ruellia*, which appears to spread from gardens in Malaya; it was collected in Penang by *Stoliczka*, in Singapore by *Deschamps* and *Hullett*, n. 176.]

## 8. APORUELLIA, C. B. Clarke, n. gen.

Pollen with minute prickles or papillæ, or granulated; not honey-combed; otherwise as *Ruellia*.

To *Aporuella* may be referred *Ruellia flagelliformis*, Hemsley; *R. trichotoma*, Nees; *R. acaulis*, R. Brown; *R. spiciflora*, Benth.; *R. australis*, R. Brown; *R. Guppyi*, Hemsley; and several other South-east Asian unnamed plants. Whereas all the Hindostan species of *Ruellia* have honeycombed pollen, the species of *Aporuella* come from Malaya, South China, and Australia.

1. *APORUELLIA SUMATRENSIS*, C. B. Clarke, n. sp. *Stem* 11 in. high, with few or small leaves except at the base. *Lower leaves*: lamina 5 by 1·5 in., entire, sparsely puberulous; tip obtuse, triangular; base attenuated; upper surface dotted; the raphides obscure; petioles up to 1·5 in. long. *Flowers* in distant small clusters on long-peduncled spikes. *Floral leaves* passing into bracts, ovate or obovate, minutely pubescent, very variable in size. *Calyx* 1·75 in. long, divided rather more than half-way down; teeth 5, linear. *Corolla* 3·5 in. long; tube linear. *Stamens* 4, didynamous; anthers subsimilar, of two parallel muticous cells; filaments glabrous; pollen small, globose, 25  $\mu$  in diam., granular. *Style* hairy, one branch linear, the other nearly wanting. *Capsule* 6 in. long, seed-bearing from the base; seeds about 12, ovate, compressed, shaggy, with hygroscopic hairs on the margin.

SUMATRA: R. Moesie, alt. 600 ft., *H. O. Forbes* 2636!

VAR.  $\beta$  *Ridleyi*, C. B. Clarke. *Leaves* more obovate than in the type, completely rounded at the top; *flowers* pure white (Ridley).

SELANGOR: Batu Caves, *Ridley* 8213; Kwala Lumpor, *Curtis* 2364.

2. *APORUELLIA AXILLARIS*, C. B. Clarke, n. sp. *Branches* (seen) 1 foot long, undivided; internodes 2 in. long. *Leaves* opposite, equal; blade 3·25 by 1·5 in., ovate-triangular, subobtuse, slightly hispidulous, suddenly attenuate at base; petiole 2·5 in. long. *Flowers* in clusters of 1 to 3 in the axils, supported by oblong bracts 2·5 to 3·5 in. long. *Sepals* 5, linear, 2 in. long, pubescent. *Corolla* 8 in. long, narrowly-funnel-shaped. *Stamens* 4; anther-cells 2, parallel, oblong, obtuse at base; pollen globose, 45  $\mu$  in diam., papillose, subechinate. *Capsule* nearly 5 in. long, stalked, with 7 flattened seeds in the clavate head.

MALAY PENINSULA: Songkah, *Curtis*.

This plant—in habit, leaves, inflorescence, corolla, capsule—simulates the very common *Ruellia prostrata*, Lam., var. *dejecta*; the pollen is unlike.

### 9. *STENOTHYRSUS*, C. B. Clarke, n. gen.

Inflorescence a terminal, peduncled, compound, many-flowered, nearly glabrous, subbracteate-linear panicle (8 to 12 by 7·5 in.); otherwise as *Hemigraphis*.

This genus agrees in character very closely with the Tropical African genera *Mellera* and *Paulo-Wilhelmia*, but the habit and hairs are very different.



1. *STENOTHYRSUS RIDLEYI*, C. B. Clarke, n. sp. *Upper leaf*: blade up to 8 by 2 in., obovate-lanceolate, acuminate at either end, acute, nearly glabrous, entire, reticulate, full of raphides; main nerves 12 pair, oblique; petiole 1·5 in. long. *Peduncle* 1 to 4 in.; thyrus interrupted at base, of 20 to 50 flowers, clustered in very small opposite cymes; bracts inconspicuous, setaceous. *Calyx* 1·75 in. long; sepals 5, linear, full of raphides. *Corolla* 1 to 1·5 in. long, blue; tube cylindric, narrow-campanulate in the upper half, minutely hairy. *Stamens* 4, subsimilar; filaments glabrous, connected in pairs; anthers long, of 2 linear-oblong cells at equal height, pubescent, minutely 1- to 2-mucronate at the base, connective mucronate at tip; pollen globose, 40  $\mu$  in diam., longitudinally 20-ribbed. *Style* thinly hairy, with one oblong-linear and one suppressed branch. *Capsule* (not ripe) narrowly ellipsoid, glabrate, seed-bearing from the base, with eight ovate flattened seeds.

PERAK: Tambun Loh, *Ridley* 9770; Ipoh, limestone rocks, *Curtis* 3149.

Ridley placed this plant close to *Strobilanthes*; the numerous capsules are all 8-seeded. There are, on one sheet, three thyrsi 8 to 12 by 1 in., and one thyrus reduced (apparently accidentally) to a dense head.

#### 10. *HEMIGRAPHIS*, Nees.

Herbs or undershrubs. *Leaves* opposite, subequal, often crenate, sometimes lobed; upper surface with raphides, which are sometimes altogether obscure. *Flowers* in terminal spikes, or rarely in 1- to 3-flowered small heads on axillary peduncles; bract usually exceeding the calyx, lanceolate or ovate; prophylla linear, short or 0. *Calyx* deeply 5-fid; segments lanceolate-linear or linear, subequal. *Corolla* tubular-campanulate, blue to white; lobes rounded, twisted in the bud. *Stamens* 4, didynamous; anthers of 2 oblong, subequal, parallel, mucous, glabrous cells; filaments glabrous, or the 2 longer with many long hairs; pollen rather large, from short-ellipsoid to oblong-ellipsoid; the 12 to 16 longitudinal ribs reaching to the poles; stopples 2. *Ovary* oblong, with 6 to 12 ovules, usually hairy at tip; style shortly hairy at base; stigma of one elongate and one suppressed lobe. *Capsule* oblong or linear-obovoid, slightly flattened, hardly stalked; seeds 6 to 12, ovoid, flattened, with much hygroscopic hair on the margin.—Species 30 perhaps, in South-east Asia and Polynesia.

To this genus belong *Ruellia repanda*, Linn.; *R. Ravacensis*, Nees; *R. nemorosa*, Zoll.; *R. colorata*, Nees; and, as Bentham says, most of Nees' first section of *Ruellia*.

Sect. 1. Flowers less than .75 in. long, 1 to 3 together in small short-peduncled heads .. .. . 1. *H. Ridleyi*.

Sect. 2. Flowers less than .75 in. long, in rather loose spikes:—

Sepals softly hairy, tips ligulate-triangular:—

Mature leaves nearly glabrate .. .. . 2. *H. confinis*.

Mature leaves hairy .. .. . 3. *H. hirsuta*.

Sepals with linear-subulate white-hispid tips:—

Capsule hardly .25 in. long, nearly terete .. .. . 4. *H. alternata*.

Capsule more than .25 in. long, obovoid, flattened .. .. . 5. *H. platycarpus*.

1. *HEMIGRAPHIS RIDLEYI*, C. B. Clarke, n. sp. *Branches* (seen) 1 foot long, rambling or creeping, rooting, scabrid-pubescent with small sub-erect hairs. *Leaves* in equal opposite pairs; blade 2 by 1 in., ovate-elliptic, acute, crenate; upper surface with few scattered several-celled bristles (few of these bulbous at base), and with many conspicuous raphides; petioles .25 to .35 in. long. *Flowers* 1 to 3 in small heads on axillary peduncles .175 to .25 in. long; bract oblong .35 in. long; bracteoles (prophylla) linear, hardly half as long as the calyx. *Calyx* .175 in. long; sepals lanceolate-linear, with several-celled white hairs. *Corolla* .5 in. long. *Stamens* and anthers of the genus; filaments with long white simple hairs; pollen 60 by 30  $\mu$ , with 12 to 16 ribs and two large stopples. *Ovary* oblong, 8-ovulate, glabrous, but hairy at the top. *Style* slightly hairy at the base; one stigmatic branch elongate, the other suppressed. *Capsule* not seen.

PAHANG: *Ridley* 2180 (probably *H. confinis*, *Ridley* in Trans. Linn. Soc. ser. 2, III. 332 (1893)).

This is allied, in inflorescence and habit, to *Hemigraphis ravacensis* (Nees sub *Ruellia*).

2. *HEMIGRAPHIS CONFINIS*, T. Anders. in Journ. Linn. Soc. IX. 463 (1867). *Stem* 2 feet, branching, pubescent. *Leaves*: blade up to 4 by 1.7 in., elliptic, narrowed at either end, obscurely crenate, mature a grey-green and nearly glabrous; raphides in the upper surface obscure; petiole .25 in. long. *Spikes* 1 to 2 by .7 in., continuous but rather loose; bract .5 in. long, obovate or elliptic with triangular tip; prophylla linear, hardly half as long as the calyx. *Calyx* .35 in. long, softly hairy; sepals ligulate upwards with triangular tip. *Corolla* .5 in. long. *Stamens* of the genus; filaments nearly glabrous; pollen 50 by 30  $\mu$ , with 12 to 16 longitudinal ribs and no stopples. *Ovary* glabrous, except at the tip; style of the genus. *Capsule* .25 in. long, slightly flattened, glabrous except at the tip, 8-seeded nearly from the base. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 423. *Ruellia confinis*, Nees in DC. Prodr. XI. 148; Miq. Fl. Ind. Bat. II. 788.

MALACCA: *Cuming* 2354; *Griffith* (K.D.) 6188; *Hervey*; *Hullett*; *Maingay* 1754, 3147, (K.D.) 1174.—DISTRIB. Borneo.

3. *HEMIGRAPHIS HIRSUTA*, T. Anders. in Journ. Agri.-Hort. Soc. Ind. N.S. I. 270 (1868). Hairy. *Leaves* (even fully mature) hairy beneath; the upper surface densely clothed by conspicuous raphides; otherwise as *H. confinis*, T. Anders. *Justicia hirsuta*, Vahl Symb. II. 3, Enum. I. 121. *J. brunelloides*, Lam. Illustr. I. 40. *Nelsonia hirsuta*, Roem. & Sch. Syst. I. 172.

MALACCA: *Ridley* 10759.—DISTRIB. Java, Borneo.

This may be esteemed merely a hairy var. of *H. confinis*, but was kept up by T. Anderson. There are several other Malay sp. of *Hemigraphis* very closely allied.

4. *HEMIGRAPHIS ALTERNATA*, T. Anders. in Journ. Linn. Soc. VII. 114 (1864). *Stem* 12 to 18 in., rooting near the base, pubescent. *Leaves*: blade 2·5 by ·75 to 1 in., narrowed at either end, obscurely crenate, mature, sparsely hispid-pubescent; upper surface sprinkled with raphides; petiole ·25 to ·5 in. long. *Spikes* ·5 to 1·5 in. long, loose; bract ·5 to ·7 in. long, oblong subacute, hispid on margins. *Calyx* ·35 in. long; sepals lanceolate with linear tips, lower part glabrate, densely covered with raphides; tips with some several-celled white hispid hairs. *Corolla*, *stamens*, *ovary*, as of *H. confinis*, T. Anders. *Capsule* scarcely ·25 in. long, very little compressed, not obovoid, with 10 to 12 seeds placed subequally along its whole length, glabrous except at the tip. *Ruellia alternata*, Burm. Fl. Ind. 135 (*excluding tab. Rheedei*). *R. discolor*, Nees in DC. Prodr. XI. 149. *R. Blumeana*, Nees in DC. Prodr. XI. 149; Miq. Fl. Ind. Bat. II. 789 (as to his var. (Zollinger 660) only).

PAHANG: *Ridley* 2183 ("flower white"). JOHORE: *Ridley* 11129.—DISTRIB. Java, Sumatra.

Described from the Nees two types (Zollinger 343, 660) written up by his hand at Kew. Miquel's "*R. Blumeana*" (named by his hand, and the same plant issued as *R. Blumeana* from the Buitenzorg Garden) is *Hemigraphis Decaisneana*, T. Anders., a species that has the capsule hairy to the base, and the leaves tubercular-scabrous.

5. *HEMIGRAPHIS PLATYCARPOS*, C. B. Clarke, n. sp. *Spikes* longer, denser (than in *H. Blumeana*), with broader bracts, more softly hairy, less hispid. *Capsule* exceeding ·25 in. long, linear-obovate, much flattened, with 8 seeds, sterile at the base; otherwise as *H. Blumeana*.

PAHANG: *Ridley* 1408. JOHORE: *Ridley* 11128.

## 11. ENDOPOGON, Nees.

Fertile stamens 2; otherwise as *Strobilanthes*.—Species 20, in South (or East) India, extending to Singapore.

This genus is hardly worth re-establishing as a split-off from *Strobilanthes*, but Lindau has introduced the point of "2 fertile stamens only" into his diagnosis of *Pseudostenosiphonium*; so that it is necessary either to call *Endopogon* a genus or to re-unite both in *Strobilanthes*. *Strobilanthes* is so very large that it is as convenient to treat it under 4 genera as under 4 subgenera.

1. ENDOPOGON RIDLEYI, C. B. Clarke, n. sp. Puberulous. *Leaves* opposite, unequal, up to 6 by 2 in., elliptic, acuminate at either end, subentire; upper surface with scattered raphides; petioles up to 1 in. long. *Peduncles* 0 to .7 in. long, one from each axil (*i.e.* in opposite unequal pairs), each carrying one green strobilate spike, pendent in flower, 1 to 1.5 in. long; bracts .75 in. long, elliptic, acute, almost papery, loosely but closely imbricate, adnate at the base. *Flowers* 2, sessile, under each bract, without prophylla. *Calyx* .125 in. long, 5-fid to the base; sepals pubescent, 2 lanceolate-linear, 3 linear. *Corolla* .25 in. long in the bud (perhaps not much longer when expanded), white. *Stamens* 2, fertile; filaments glabrous; pollen 60 by 40  $\mu$ , longitudinally ribbed. *Ovary* (and style) glabrous, with 2 ovules in each cell.

SINGAPORE: Stagmount, Ridley 5987, 11255.

Allied to *S. adnatus*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 436, which is an *Endopogon*.

## 12. STROBILANTHES, Blume.

Herbs or undershrubs. *Leaves* opposite, often very unequal, sometimes falsely alternate, crenate serrate or subentire; the upper surface usually full of raphides. *Inflorescence* various; the flowers often in heads or strobilate, sometimes solitary in lax panicles, sometimes in small clusters which are paniced; floral leaves prominent or small, persistent or caducous, often passing into true bracts ("deckblaetter") in the upper part of a spike; bracteoles (prophylla) 2, often similar to the sepals, or wanting (but in the axil of a bracteole a bud is sometimes to be found). *Calyx* of 5 (usually rather large) segments, subequal, divided nearly to the base in the Malay species. *Corolla* tubular-campanulate; lobes rounded, twisted in the bud. *Stamens* (fertile) 4, didynamous; anther-cells 2, muticous; pollen large, ellipsoid (rarely subglobose), with 16 to 20 (rarely few) longitudinal ribs and 2 stopples. *Ovary* oblong or ellipsoid with 2 ovules in each cell, sometimes stalked; style with one long branch, the other suppressed. *Capsule* oblong or

narrow-ellipsoid, short-stalked, 4-seeded, or in many species with only 2 seeds.—Species about 200, *i.e.* after the genera *Endopogon*, Nees, *Pseudostenosiphonium*, Lindau, and *Acanthopale*, C. B. Clarke, have been taken out; extending from warmer Africa to China and Australia.

Sect. 1. Heads capitate, ocluded (except the corollas) between two erect persistent bract-like floral leaves:—

- |                                                                 |    |    |                             |
|-----------------------------------------------------------------|----|----|-----------------------------|
| Leaves scarcely hairy; bracts obtuse                            | .. | .. | 1. <i>S. Maingayi</i> .     |
| Leaves pubescent; bracts produced in a strongly crenulate tip   |    |    | 2. <i>S. bibracteatus</i> . |
| Leaves rufous-ciliate on margins; bracts with some rufous hairs | .. | .. | 3. <i>S. hirtisepalus</i> . |

Sect. 2. Flowers strobilate or in short heads, with conspicuous rufous hair:—

- |                                                                         |    |                                 |
|-------------------------------------------------------------------------|----|---------------------------------|
| Heads ovoid, .1 in. long; bracts .5 in. long, linear                    | .. | 4. <i>S. rufo-sepalus</i> .     |
| Heads strobilate, 2-25 in. long; bracts .7 in. long, spatulate-oblong   | .. | 5. <i>S. rufo-strobilatus</i> . |
| Heads capitate, 1-5 in. long; bracts .75 in. long, linear               | .. | 6. <i>S. rufo-capitatus</i> .   |
| Heads 2- to 3-flowered, very small; bracts .25 to 1 in. long, spatulate | .. | 7. <i>S. rufo-pauper</i> .      |

Sect. 3. Flowers strobilate, with grey hairs

Sect. 4. Flowers panicled; bracts caducous or inconspicuous:—

- |                                                           |    |                              |
|-----------------------------------------------------------|----|------------------------------|
| Panicle 8 by 5 in.; the flowers in opposite distant parts | .. | 9. <i>S. collinus</i> .      |
| Panicle 6 by 1 in.; branches scarcely .25 in. long        | .. | 10. <i>S. pachyphyllus</i> . |

1. STROBILANTHES MAINGAYI, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 448 (1884). Perennial, 2 to 4 ft. high, sparingly pubescent. Leaves opposite, often very unequal, the larger 3 by 1 to 1-25 in., crenulate, tip acuminate; midrib beneath minutely scabrid; surface beneath often microscopically furfuraceo-puberulous, rarely at all hairy; petiole .125 to .25 in., pubescent. Flowers 1 to 5, capitate, in an ovoid subsessile head enclosed by two ovate erect floral bract-like leaves; bract 1 by .25 in., quadrate-oblong, keeled, tip rather wide, subobtuse, crenate; prophylla similar to sepals. Sepals .4 in. long, glabrous, oblong-subacute, membranous. Corolla 2 in. long, white (so noted on several collections); tube long, narrow, funnel-shaped, linear at base. Stamens 4, fertile, subsimilar; anthers oblong; filaments glabrous, except sometimes 2 or 3 hairs close to the base; pollen ellipsoid, large (70 by 40  $\mu$ ), with 12 to 16 longitudinal ribs and 2 stopples. Style with a few scattered hairs. Capsule (not seen in the type examples) oblong, .5 in. long, with 4 seeds, shaggy all over with hygroscopic hairs.

PENANG: *Maingay* (K.D.) 1182; alt. 1800 to 2000 ft., *Ridley* 7167; *King's Collector* 1545, 1791. KEDAH: *Curtis* 298. PERAK: 3000 to 4000 ft., *King's Collector* 8316. SELANGOR: *Kelsall* 2004.

The "type" of *S. Maingayi* (K.D. 1182) has supplied neither flower nor fruit; the above description is taken largely from Curtis 298. In King's Collector 1545, the collector notes "flowers dark blue, white inside"; but I can find no difference between this n. 1545 and n. 1791 (noted as having white flowers) collected by the same collector in the same locality.

2. *STROBILANTHES BIBRACTEATUS*, Blume Bijdr. 799 (1825). Rather more pubescent than *S. Maingayi*. Leaves often with scattered hairs on the surface beneath. Tips of the bracts produced, conspicuously toothed. Filaments, in their whole lower half, with long, deflexed several-celled hairs; otherwise as *S. Maingayi*. Miq. Fl. Ind. Bat. II. 801. *Goldfussia bibracteata*, Nees in DC. Prodr. XI. 174. *Dicliptera ? crenata*, Miq. Fl. Ind. Bat. II. 844.

PERAK: Maxwell's Hill, Ridley 5516; Wray 174, 1674; *Scortechini* 337, 1413.—DISTRIB. Java, Sumatra.

There is another closely allied plant collected in Sumatra (Forbes 1906), which differs little but by having the flowers "pale purplish blue." *S. erosus*, Nees in DC. Prodr. XI. 181, appears to be this species, as Nees suspected; but I have seen no authentic example of *S. erosus*.

3. *STROBILANTHES HIRTISEPALUS*, C. B. Clarke, n. sp. More hairy than *S. bibracteatus*. Leaves minutely rufous-hairy on the margins. Floral leaves (involucral bracts) with rufous hairs. Sepals linear, very hairy, with rufous several-celled hairs. Otherwise as *S. bibracteatus*.

PERAK: Larút, alt. 1000 to 1500 ft., King's Collector 2215; *Scortechini* 940.

4. *STROBILANTHES RUFO-SEPALUS*, C. B. Clarke, n. sp. Branches 18 in. long, rufous-hairy, procumbent, divided, rooting near the base. Leaves opposite, one about twice as long as the other, longer one 2.25 by .25 in.; elliptic-acuminate, crenate, sparsely hispid on the upper surface; raphides obscure; petiole .2 in. long. Heads 1 in. long, ovoid, few-flowered, terminal and axillary. Bracts linear, .5 in. long, with several-celled bright-rufous hairs. Sepals .35 in. long, linear-subulate, with several-celled bright-rufous hairs in the upper half. Corolla 1 in. long; tube campanulate from a short linear base. Stamens 4; longer filaments hairy in their lower half; pollen 50 by 30  $\mu$ , longitudinally ribbed. Style glabrous, except close to the apex of capsule. Capsule .35 in. long, glabrate, with 4 young seeds.

PENANG: alt. 2000 ft., Ridley & Curtis 2761. PERAK: *Scortechini*; Ipoh, Curtis.

This species is near *Strobilanthes anamiticus*, O. Kuntze Revisio, I. 498 (1891).

5. *STROBILANTHES RUFO-STROBILATUS*, C. B. Clarke, n. sp. Branches rufous-hairy, creeping, rooting at the base. *Leaves* opposite, nearly equal, 4 by 2 in., cuneate at either end, crenate, nearly glabrate on the upper surface; petiole .5 in. long. *Heads* strobilate, 2 to 2.5 in. long; bracts (floral leaves) prominent even to the top of the head, .7 by .25 in., narrowed at either end; bracts .5 in. long, linear-spathulate, densely rufous with several-celled hairs. *Sepals* .4 in. long, linear, rufous-hairy. *Corolla* 1.25 in. long; tube campanulate, curved; lobes "purple" (Scortechini). *Stamens* 4; filaments hairy. *Ovary* pubescent at the apex, 4-ovulate; pollen 70 by 40  $\mu$ , longitudinally multi-striate.

PERAK: *Scortechini* 225.

6. *STROBILANTHES RUFO-CAPITATUS*, C. B. Clarke, n. sp. "Shrubby creeper, 6 to 8 ft. long." Branches rufous-hairy. *Leaves* subequal or very unequal, up to 8 by 3.5 in., cuneate at either end, crenate; upper surface nearly glabrate; petioles .35 in. long. *Heads* sessile or peduncled, 1 to 2 in. long, densely clothed with bright rufous several-celled long hairs; bracts (floral leaves) .75 by .125 in., linear, shaggy on the margin, with rufous hairs .125 in. long; bracts .25 to .35 in. long; rufous-hairy; sepals linear, .25 in. long, rufous-hairy. "*Corolla* white."

PERAK: alt. 2500 to 3000 ft., *King's Collector* 10935; *Scortechini* 568.

7. *STROBILANTHES RUFO-PAUPER*, C. B. Clarke, n. sp. Slender, procumbent, rooting at the nodes, pubescent. *Leaves* opposite, more or less unequal, up to 2 by .7 in., elliptic-lanceolate, crenate; upper surface nearly glabrous; petioles .125 to .25 in. long. *Heads* very small, 2- to 3-flowered; bracts (floral leaves) .25 to 1 in. long, very narrowly spathulate, sparingly or obscurely hairy; bracts .25 in. long, linear, more or less rufous-hairy. *Calyx* .2 in. long; sepals linear, pubescent, with long several-celled straight rufous hairs at the tips. *Corolla* 1 in. long, "blue" (Ridley), nearly straight, narrow-funnel-shaped. *Stamens* 4; filaments glabrous; pollen 70 by 40  $\mu$ , longitudinally ribbed. *Ovary* and style glabrous. *Capsule* with 4 hairy seeds.

PERAK: Maxwell's Hill, alt. 3000 ft., *Wray* 4192; the Cottage, alt. 5000 ft., *Ridley* 5515.

8. *STROBILANTHES DYERIANUS*, Masters in Gard. Chron. ser. 3, XIII. 442 (1893). Shrubby, vagant. *Leaves* opposite, unequal, sessile; blade of the larger one up to 7 by 3 in., elliptic-lanceolate, subacute, crenulate, nearly glabrate, often auricled at the base. *Peduncles* axillary, 1 to 3 in. long, with scattered, small, ovate leaves (.75 in. long), each terminated by a strobilate spike 1 to 2 in. long, pubescent (without rufous hair). *Bracts* .25 to .35 in. long, round-obovate. *Corolla* 1.3 in. long, violet-blue, *Stamens* 4; filaments glabrous; anther-cells short-oblong;

pollen 50  $\mu$  long, 30  $\mu$  broad, with 12 to 14 strong longitudinal striations. Kew Bull. 1894, Append. II. 51; Hook. Bot. Mag. t. 7574.

PENANG: *Curtis*.

This may not be indigenous in the Malay Peninsula. A note of Curtis says "originally collected in Burma by Boxall."

9. *STROBILANTHES COLLINUS*, Nees in Wall. Pl. As. Rar. III. 86 (1832). Attains 4 ft. *Leaves* opposite, equal, up to 10 by 3 in., elliptic, acuminate at either end, serrate, nearly glabrous, clothed with raphides on both surfaces; petiole hardly 1 in. long. *Panicles* terminal, open, often 8 by 5 in.; the flowers sessile, distant, in opposite pairs along the pubescent branches; bracts narrowly obovate-oblong, obtuse, .75 in. long, early falling. *Sepals* 5, subequal, .25 in. long, linear, hairy. *Corolla* 1.5 in. long, narrow, tubular-campanulate, white tinged pink. *Stamens* 4; filaments hairy; pollen ellipsoid, longitudinally striate. *Ovary* and *style* pubescent. *Capsule* .7 in., linear-oblong, pubescent; seeds 4, hairy. Nees in DC. Prodr. XI. 192; Miq. Fl. Ind. Bat. IV. 801; T. Anders. in Journ. Linn. Soc. IX. 476 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 465. *Ruellia collina*, Wall. Cat. 2343.

SINGAPORE: *Lobb*. PENANG: *Wallich* 2343. PERAK: alt. 2000 ft., *Curtis* 1313; alt. 300 to 800 ft., *King's Collector* 7271, 8490.

10. *STROBILANTHES PACHYPHYLLUS*, C. B. Clarke, n. sp. Shrub, up to 4 ft. high. *Leaves* opposite, equal, 5.5 by 2 in., elliptic, obscurely obovate, acute at either end; under surface pubescent ("silvery grey" when fresh), densely clothed with raphides, obscurely crenate, remarkably thick, hard in texture; petiole 1.5 in. *Panicle* terminal, long-peduncled, 6 by 1 in.; lateral branches scarcely .25 in. long. *Sepals* 5, subequal, .25 in. long, linear, glabrous, full of raphides. *Corolla* 1.25 in. long, very narrowly tubular-campanulate, light-blue. *Stamens* 4; filaments hairy in the lower half; anthers oblong, muticous; pollen exactly globose, 40  $\mu$  in diam., 20-ribbed, 2-stopped. *Style* thinly hairy.

PERAK: hill-top, *Scortechini* 1786; alt. 1600 to 2000 ft., *King's Collector* 7150.

The material represents the species imperfectly; it appears allied to *S. collinus*, Nees; the texture of the leaves is distinctive, and the globose pollen is very unusual in the genus *Strobilanthes*.

### 13. *ACANTHOPALE*, C. B. Clarke, n. gen.

Pollen globose, echinate, without ribs; otherwise as *Strobilanthes*. Species 8, in tropical Africa with Madagascar; and many Indian.

Among the *Strobilanthes* to be removed to *Acanthopale* are *S. lanceolatus*, Nees; *S. pulneyensis*, C. B. Clarke; *S. Zenkerianus*, T. Anders.; *S. Arnottianus*, Nees;



*S. exsertus*, C. B. Clarke; *S. ixiocephalus*, Benth.; *S. Gardnerianus*, T. Anders.; *S. vestitus*, Nees; *S. laxus*, T. Anders.; *S. Hookeri*, Nees; *S. Andersonii*, Benth.; *S. bolamputtensis*, Bedd.; *S. acrocephalus*, T. Anders.; *S. radicans*, T. Anders.; *S. debilis*, Hemsl.; *S. divaricatus*, T. Anders.; *S. oliganthus*, Miq.; *S. japonicus*, Miq.

1. ACANTHOPALE? MALASICA, C. B. Clarke, n. sp. *Branch* nearly round, glabrate, at the tip sparsely hairy. *Leaves* opposite, equal; blade 2·5 by 1 to 1·5 in., elliptic-triangular, nearly entire, scarcely pubescent; upper surface with raphides; tip hardly acute; base deltoid; petiole ·25 in. long. *Flowers* in poor, axillary, sessile or short-peduncled spikes; floral leaves caducous, not seen; bract ·5 in. long, linear-ligulate, glabrous; bracteoles (prophylla) ·25 in. long, linear, glabrous. *Sepals* 5, equal, ·25 in. long, linear, slightly hairy at the tips. *Corolla* ·75 in. long at least, nearly glabrous. *Stamens* 4, perfect; filaments glabrous; anthers oblong, muticous, parallel, at equal height; pollen globose, 50  $\mu$  in diam., with bluntish spines, not ribbed. *Ovary* glabrous; style thinly hairy, one branch long, the other suppressed. *Capsule* ·7 in. long, with a long sterile base; seeds 4, crowded in the globose head, hygroscopic-shaggy.

KEDAH: Lankawi Island, *Ridley* 8298.

The doubt as to the genus of this plant arises because the specimen is in such a state that I am not sure that the grain of pollen described may not have been a stray grain.

#### 14. ACANTHUS, Linn.

Harsh glabrous shrubs. *Leaves* often prickly. *Flowers* showy, spiked; bract ovate; prophylla (bracteoles) 2 or 0. *Calyx* 4-partite nearly to the base; 2 inner segments much narrower than the 2 outer, subopposite. *Corolla* strongly 2-lipped; the posticous lip 0, *i. e.* truncated close to the base; anticous lip 3-lobed, nearly flat, blue or white; the mid-lobe bifid. *Stamens* 4, subsimilar; filaments glabrous. *Anthers* 1-celled, oblong, muticous, conspicuously fringed by white hairs; pollen ellipsoid, with 3 narrow longitudinal chinks. *Ovary* with 2 to 4 ovules in each cell. *Capsule* ellipsoid, woody, large, shining brown, 2- (rarely 4-) seeded; seeds discoid, without hairs.—*DISTRIB.* Species 8 or 10, extending from South Europe and Africa to Polynesia.

Stiff, erect shrubs:—

Corolla 1·25 in. long, blue; prophylla ·25 in. long	..	1. <i>A. ilicifolius</i> .
Corolla ·75 in. long, white; prophylla 0	..	2. <i>A. ebracteatus</i> .
Twining, subscandent	.. ..	3. <i>A. volubilis</i> .

1. ACANTHUS ILICIFOLIUS, Linn. Sp. Pl. 639 (1753). Shrub with many stout branches, 1 to 5 ft. high. *Leaves* 4 to 7 by 1 to 3 in.,

subpinnatifid, spinous, nearly sessile. *Spikes* 6 by 1·5 in.; bracts ·3 in. long, ovate; prophylla ·25 in. long, triangular-lanceolate. *Calyx-segments*; 2 outer subsimilar, ·5 to ·7 by ·3 in., round-ovate; 2 inner (alternate with the outer) shorter, much narrower. *Corolla* 1·25 in. long or more, blue. *Capsule* 1 by ·5 in.; seeds large, with close brain-like convolutions. Benth. Fl. Austral. IV. 548 (*partly*); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481 (*with syn.*); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 319; Hemsl. in Journ. Linn. Soc. XXVI. 242 (1890); Prain Beng. Plants 800.

PENANG: *Deschamps*, King. MALACCA: *Griffith*. SINGAPORE: *Ridley* 8097. PERAK: *Wray* 2494, 2499; *Scortechini*.—DISTRIB. In saline mud, from Africa to Polynesia.

VAR.  $\beta$  *integrifolia*, T. Anders. *Axillary peduncles* numerous, running into large terminal panicles; leaves elongate, lanceolate, entire or nearly so.—DISTRIB. Andamans.

2. ACANTHUS EBRACTEATUS, Vahl Enum. II. 75, t. 40 (1791). *Bracts* caducous; prophylla 0. *Calyx* ·3 in. long. *Corolla* ·75 in. long, white; otherwise as *A. ilicifolius*, Linn. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 319; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900).

MALACCA: *Griffith*, *Maingay* 3084. PAHANG: *Ridley* 1276.—DISTRIB. Salt marshes, from the Andamans to Cochin-China and Java.

Bentham doubts whether this species is distinct from *A. ilicifolius*, Linn. Ridley n. 1276 is a typical example of *A. ebracteatus*, with flowers very much smaller than those of *A. ilicifolius*.

3. ACANTHUS VOLUBILIS, Wall. Pl. As. Rar. II. 56 t. 172 (1831). Twining, unarmed. *Leaves* oblong or elliptic, entire, glabrous. *Spikes* linear-oblong; prophylla 0. *Corolla* white, 1 in. long. Kurz For. Fl. II. 242; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900). *Dilivaria volubilis*, Nees in Wall. Pl. As. Rar. III. 98. *D. scandens*, Nees in DC. Prodr. XI. 269.

PENANG: *Curtis* 510. SINGAPORE: fide *Ridley*.—DISTRIB. Coast of India, Siam, Malaya, Australia.

The dried tips of the branches are difficult to separate from those of *A. ebracteatus*; the leaves are usually entire or slightly prickly; the flowers larger.

## 15. GYMNSTACHYUM, Nees.

Herbs or undershrubs, sparingly pubescent. *Leaves* lanceolate to obovate, entire or crenulate, petioled. *Panicle* (in the Malay Peninsula

species) terminal, sometimes of several elongate branches; branches linear, with very small lateral cymes, or reduced to spikes; bracts linear, very small; prophylla hardly any. *Calyx* small, less than .2 in. long, divided deeply into 5 linear segments, pubescent or puberulous. *Corolla* .5 to 1 in. long; tube narrow; limb 2-lipped. *Stamens* 2; anther-cells 2, oblong, parallel, at equal height, muticous; pollen small, short-ellipsoid, longitudinally (often obscurely) ribbed. *Ovary* conic, many-ovulate, nearly glabrous; style at tip shortly 2-fid. *Capsule* .5 to 1 in. long, linear, glabrate, with parallel sides, 8- to 20-seeded from the base. *Seeds* ovoid, flattened, obscurely hairy. Species 25 to 30, in South-east Asia, North Australia, Polynesia.

This genus, varying in size, is distinguished by the linear (not clavate) many-seeded capsule. The small-sized group, *Gymnostachyum* proper, has (A) the flowers clustered or opposite (B) the flowers, solitary, alternate; but of the group (A) there is no example from the Malay Peninsula.

Stems 1 to 4 in. long. Flowers solitary in long spikes:—

Spikes linear, simple. Corolla blue, toward the base whitish:—

Leaves suddenly narrowed on the winged petiole .. 1. *G. decurrens*.

Leaves spatulate on the petiole:—

Corolla .75 in. long or more .. .. 2. *G. diversifolium*.

Spikes linear, somewhat branched; corolla white .. 3. *G. pallens*.

Stem elongate; panicle with many long, linear branches .. 4. *G. polyneuron*.

Stems 1 to 3 ft. long; inflorescence terminal; bracts minute; stamens, pollen, and style as of *Gymnostachyum*; but the capsule is not known in any of the following species:—

Panicle 2 to 3 in. long, short-peduncled; flowers 8 to 20:—

Spike slender, linear; style hairy .. .. 5. *G. simplicicaule*.

Spike denser; style glabrous:—

Leaves with 5 to 6 pairs of nerves .. .. 6. *G. hirtistylum*.

Leaves with 9 to 11 pairs of nerves .. .. 7. *G. magis-nervatum*.

Panicle 8 in. long, usually branched:—

Leaves not exceeding 2.5 in. in breadth:—

Leaves thick, attenuate at either end .. .. 8. *G. knoxiiifolium*.

Leaves elliptic, shortly acuminate:—

Panicle with long branches .. .. 9. *G. ? Scortechinii*.

Panicle linear, with short lateral cymes .. .. 10. *G. Ridleyi*.

Leaves 6 in. wide .. .. 11. *G. ? magnum*.

# 1. GYMNSTACHYUM DECURRENS, Stapf in Kew Bull. 357 (1894).

*Stem* 1 to 4 in. high. *Leaves* up to 5 by 3 in., pubescent beneath, ovate; tip triangular; margin undulate; nerves 6 pairs, the lowest patent; base suddenly narrowed, often decurrent on the petiole. *Spikes*

linear, 4 to 7 in. long (5 on one stem); flowers all solitary; bracts minute, linear. *Sepals* hardly .15 in. long, linear, pubescent. *Corolla* .5 to .6 in. long, pubescent, blue. *Stamens* 2; filaments glabrous upwards; anther-cells 2, oblong, parallel at equal height, minutely or obscurely mucronate at base; pollen ellipsoid, 20  $\mu$  long, obscurely ribbed longitudinally. *Ovary* minutely pubescent; style thinly hairy, with one branch suppressed. *Capsule* .7 in. long, linear, glabrate, 20-seeded.

PAHANG: *Ridley*.

2. *GYMNOSTACHYUM DIVERSIFOLIUM*, C. B. Clarke, n. sp. Creeping. *Stems* 1 to 4 in. *Leaves* up to 5 by 2.25 in., slightly pubescent beneath, ovate; tip triangular; margin entire; nerves 8 pairs; base suddenly narrowed, shortly decurrent on the petiole, or (on every plant) one leaf truncate or cordate at base. *Spikes* linear, 2 to 5 in. long, 1 to 3 on one stem; flowers all solitary; bracts minute or none. *Calyx* scarcely .15 to .2 in. long. *Corolla* .75 in. long or rather more. Otherwise as *G. decurrens*, Stapf.

KEDAH: *Curtis* 2530. PERAK: alt. 400 to 600 ft., *King's Collector* 8284, 936; *Scortechini* 1589.

In every plant the leaves are decurrent on the petiole; but there are one or two upper leaves truncate or even cordate at base; the same may be observed in several of these small *Gymnostachyum*s. This plant is nearly allied to *G. decurrens*, Stapf; the leaves are of thinner texture, with thinner nerves.

3. *GYMNOSTACHYUM PALLENS*, C. B. Clarke, n. sp. Rhizome 1.5 in. long, woody, nodose. *Stem* .5 to 1 in. long. *Leaves*: blade 4 by 2.5 in., broad-ovate; tip subobtusely, nearly glabrous, shortly decurrent on the petiole; margin wavy-crenate; upper surface densely punctate; lower surface pale green. *Spike* 3 to 4 in. long, on a 3 to 4 in. peduncle, slightly branched, minutely pubescent; flowers solitary. *Calyx* .125 in. long. *Corolla* .5 in. long, white. *Capsule* rather more than .5 in. long.

PERAK: alt. 300 to 500 ft., *King's Collector* 8133.

4. *GYMNOSTACHYUM POLYNEURON*, C. B. Clarke, n. sp. Top of stem leafy, 3 in. long (seen). *Leaves* spatulate; blade ovate, 5 by 2.25 in.; tip triangular-obtusely, nearly glabrous; primary nerves 10 pairs; petioles 1.5 in. long. *Panicle* terminal, compound; ultimate spikes 2 to 5 in. long, linear; flowers distant, solitary, subsessile. *Sepals* .125 in. long, linear, nearly glabrous. *Corolla* .5 in. long; "lower lip deep violet, upper white splashed with violet." *Stamens* 2; anther-cells 2, narrow oblong, at equal height, not tailed; pollen ellipsoid, 30  $\mu$  long, with 2 stopples and 2 longitudinal rows on either side of each stopple. *Ovary*

nearly glabrous; style shortly 2-fid, thinly hairy in the lower half. *Capsule* .5 in. long, linear-oblong, glabrate, with 10 seeds.

SIAMESE STATES: Songkah, *Curtis*.

5. *GYMNOSTACHYUM SIMPLICICAULE*, C. B. Clarke, n. sp. Slightly pubescent. *Stem* 1 to 2 ft. long, undivided (in any example seen). *Leaves*: blade 3 by 1 in., elliptic, obtusely triangular at either end, entire; nerves 5 to 6 pairs, obscure; petioles .25 to .5 in. long. *Panicle* terminal, few-flowered, reduced almost to an oblong spike; peduncle hardly 1 in. long; bracts minute. *Sepals* hardly .125 in. long, linear. *Corolla* hardly .5 in. long, grey-yellow, 2-lipped. *Stamens* 2; filaments glabrous; anther-cells 2, narrowly oblong, parallel, nearly at equal height, muticous; pollen 30 by 15  $\mu$ , narrowly ellipsoid; stopples 2, longitudinally obscurely ribbed. *Style* upwards glabrous, very shortly bifid at tip.

PERAK: alt. 3000 to 3500 ft., *King's Collector* 893, 935, 2394; *Scortechini* 688.

6. *GYMNOSTACHYUM HIRTISTYLUM*, C. B. Clarke, n. sp. Glabrate, the inflorescence pubescent. *Stems* nearly a foot high, simple, decumbent, rooting at the base. *Leaves* opposite, equal; blade elliptic-acute, 4 by 2 in., without raphides; base broadly cuneate; nerves 6 to 7 pairs; petioles .2 in. long. *Inflorescence* of 2 terminal, simple, linear, slender, interrupted, ebracteate spikes; peduncles .5 to 1 in. long; flower-clusters of 1 to 2 flowers, opposite, the lower pairs distant. *Sepals* hardly .125 in., linear. *Corolla* white, very small, with a short tube. *Stamens* 2; anther-cells 2, at equal height, not tailed; pollen very shortly ellipsoid. *Style* hairy; tip shortly bifid.

PERAK: alt. 400 to 600 ft., *King's Collector* 10814.

7. *GYMNOSTACHYUM MAGIS-NERVATUM*, C. B. Clarke, n. sp. Almost glabrous. *Stem* 12 to 18 in., decumbent, rooting near the base, branched. *Leaves* opposite, equal; blade 3.5 by 1.3 in., elliptic-lanceolate, acuminate at either end; nerves 9 to 11 pairs, oblique; both surfaces with raphides, the lower also densely, minutely dotted; petioles .2 in. long. *Peduncles* terminal, hardly .5 in. long. *Spikes* 2.5 in. long, simple; flowers 12 to 20, opposite; bracts minute. *Sepals* hardly .1 in. long, lanceolate, nearly glabrous. *Corolla* .5 in. long, very narrow, cream-coloured, 2-lipped nearly half-way down. *Stamens* 2; filaments glabrous; anther-cells 2, rather large, oblong, at equal height, muticous; pollen 40 by 25  $\mu$ , with 10 strong longitudinal ribs. *Pistil* glabrous; ovules 8 or more.

PERAK: alt. 100 ft., *King's Collector* 6542.

8. *GYMNOSTACHYUM KNOXIFOLIUM*, C. B. Clarke, n. sp. Nearly glabrous, except the minutely pubescent inflorescence. *Stem* erect, with long

internodes. *Leaves*: blade 6·5 by 2 in., broadly lanceolate, tapering at either end, texture thick, without raphides; nerves 7 pairs, springing very obliquely and curving inwards; petioles ·25 in. long. *Panicle* of two branches; branch 8 in. long, linear, with small, opposite, distant cymes; bracts hardly ·2 in. long, linear. *Sepals* ·075 in. long, oblong-linear. *Stamens* 2; filaments glabrous, each with a minute tooth at base; anther-cells narrow-oblong, parallel at equal height, muticous. *Ovary* nearly glabrous, many-ovuled; style thinly hairy; tip minutely 2-fid. Buds very young; corolla noted white by collector.

NEGRI-SEMBILAN: *King's Collector* 10085.

9. *GYMNOSTACHYUM* ? *SCORTECHINII*, C. B. Clarke, n. sp. *Stem* erect, at least 12 to 18 in. high. *Leaves*: blade 7·5 by 2·5 in., elliptic, acuminate at either end, entire; upper surface with raphides; lower minutely pubescent; petioles ·5 to 1·5 in. long. *Panicle* very young, 8 in. long, with long branches, many-flowered, rusty-pubescent; bracts inconspicuous; flowers mostly in approximate opposite pairs. *Calyx* ·125 in. long. *Stamens* 2; filaments glabrous at top; anther-cells 2, oblong, parallel, at equal height, acute-muticous at base; pollen 35 by 20  $\mu$ , with 2 stopples; a longitudinal row of patches (hardly tubercles) on each side of each stopple.

PERAK: *Scortechini*.

The habit of this plant might do for a *Gymnostachyum* near *G. venustum*, T. Anders., but the genus is doubtful.

10. *GYMNOSTACHYUM* *RIDLEYI*, C. B. Clarke, n. sp. A tall shrub. *Leaves*: blade 6 to 7 by 2·25 in., elliptic, shortly cuneate-acuminate at either end, pubescent beneath; petiole ·75 in. long, pubescent. *Panicles* (reduced almost to spikes) 2, terminal, 11 by ·75 in.; bracts ·125 to ·2 in. long, linear; flowers distant, solitary, or in 2- to 4-flowered lateral cymes on peduncles hardly ·15 in. long. *Sepals* ·15 to ·2 in. long, pubescent. *Corolla* white.

PERAK: *Ridley* 9772.

The example shows no corolla, no capsule.

11. *GYMNOSTACHYUM* ? *MAGNUM*, C. B. Clarke, n. sp. A shrub. *Stem* glabrate; upper internodes 7 in. long. *Leaves*: blade up to 12 by 6 in., obovate, nearly glabrate, entire; nerves 12 (or more) pairs; upper petioles 3 in. long. *Panicle* terminal, 8 by ·75 in.; bracts ·15 to ·2 in., linear; peduncle 1·5 in. long; small cymes 2- to 3-flowered in opposite approximate pairs. *Sepals* linear, ·2 in. long, pubescent. *Corolla* in very young bud. *Stamens* 2; filaments glabrous upwards; anther-cells 2, parallel, oblong, at equal height, muticous.

MALACCA: Waterfall, *Goodenough* 1893.

From the size, habit, and stamens of this plant it is almost certainly either a *Gymnostachyum* or a *Phlogacanthus*.

16. PHLOGACANTHUS, Nees.

Corolla-tube cylindric. *Capsule* narrowly ellipsoid, contracted close to the base; otherwise as *Gymnostachyum*.—DISTRIB. Species 12, in India; 1 or 2 extending a short way east.

1. PHLOGACANTHUS BREVIS, C. B. Clarke, n. sp. A branched under-shrub, 12 to 18 in. long. *Leaves*: blade 6 by 3·5 in., broadly ovate; tip subobtusely; base shortly attenuate; nerves 6 to 7 pairs; petiole 1 to 1·5 in. long. *Panicles* terminal, 2 to 4 in. long, oblong; bracts minute. *Sepals* 15 to 2 in. long, linear, minutely pubescent. *Corolla* small (only seen in bud), grey pubescent without. *Stamens* 2; anther-cells 2, oblong, parallel, at equal height, muticous; pollen 20 by 15  $\mu$ , longitudinally banded. *Pistil* glabrous. *Capsule* 1 in. long, nearly 2 in. wide upwards, subcylindric, obtuse, 8-seeded; base narrowed. *Seeds* flat, nearly 125 in. in diam.

PERAK: alt. 300 ft., *King's Collector* 2884.

The capsule is here typically that of *Phlogacanthus*; and not the parallel-sided capsule of *Gymnostachyum*; but the two genera may be united.

17. ANDROGRAPHIS, Wallich.

Herbs or very small shrubs. *Leaves* entire. *Racemes* (or spikes) 1-sided, axillary and terminal, often compounded into loose panicles with spreading branches; bract very small, narrow; prophylla hardly any; flowers solitary or in few-flowered, distant clusters. *Sepals* 5, rarely more than 2 in. long, linear. *Corolla* small (about 5 in. long), 2-lipped; base tubular; limb white, spotted pink-purple in the palate. *Stamens* 2; filaments hairy; anther-cells 2, ovate, parallel, at nearly equal height; base acute (not spurred), with often a tuft of hairs; pollen 25  $\mu$  long, short-ellipsoid, with few very slender longitudinal ribs. *Style* thinly hairy; tip minutely bifid. *Capsule* narrowly oblong, with parallel sides, seed-bearing nearly from the base, flattened from the back of the valves. *Seeds* 6 to 12, stony, cuboid-ellipsoid, smooth, glabrate, with rows of minute pits.—DISTRIB. Species 18, very closely allied, in India; 1 or 2 extending to China and Malaya.

Leaves lanceolate .. .. .	1. <i>A. paniculata</i> .
Leaves ovate .. .. .	2. <i>A. tenuiflora</i> .

1. ANDROGRAPHIS PANICULATA, Nees in Wall. Pl. As. Rar. III. 116 (1832). An erect annual, 1 to 3 ft. high. *Stem* quadrangular.

*Leaves* 2·5 by ·5 to ·75 in., lanceolate, glabrous, paler beneath; petioles ·25 in. long. *Panicle* copious, of lax divaricate racemes; lower flowers in each raceme pedicelled, solitary. *Capsule* ·75 by ·125 in., nearly glabrous when mature. Nees in DC. Prodr. XI. 515; Wight Ic. t. 518; Miq. Fl. Ind. Bat. II. 855; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 501; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 323; Prain Beng. Plants 809. *Justicia paniculata*, Burm. Fl. Ind. 9; Blume Bijdr. 788.

PENANG: *Curtis* 1877.—DISTRIB. Throughout India.

2. *ANDROGRAPHIS TENUIFLORA*, T. Anders. in Journ. Linn. Soc. IX. 502 (1867). *Leaves*: blade ovate, shortly acuminate, 2·5 by 1·5 in., obscurely puberulous; base shortly spathulate. *Racemes* (often nearly spikes) very slender, straggling. *Corolla* ·4 in. long. Otherwise as *A. paniculata*, Nees. Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 323; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 502. *Haplanthus tener*, Nees in Wall. Pl. As. Rar. III. 115, and in DC. Prodr. XI. 512.

KEDAH: *Ridley* 8331; *Curtis* 2136, 2578.—DISTRIB. Eastern India, Malaya.

#### 18. CYSTACANTHUS, T. Anders.

Shrubs or erect herbs. *Leaves* opposite, equal, entire. *Inflorescence* terminal (or axillary in some non-Malay species); panicles narrow; bracts small; prophylla 0. *Calyx* deeply 5-fid; segments narrow. *Corolla* rather large, tubular, curved and inflated, somewhat 2-lipped; segments ovate or oblong, one completely outside in the bud. *Stamens* 2; rarely 2 rudiments added; anthers of 2 oblong, parallel, muticous cells; connective often hispid on the back; pollen subglobose, with few longitudinal bands. *Ovary* with 4 or more ovules in each cell. *Capsule* linear, with parallel sides, many-seeded nearly from the base.—DISTRIB. Species 5, in India; 1 extending to Cochin-China.

1. *CYSTACANTHUS TURGIDA*, Nicholson Dict. Gard. I. 428 (1884). A glabrous shrub, 1 to 2 ft. high. *Leaves*: blade 4 to 7 in. long, oblong or narrow-elliptic, narrowed at either end; petioles ·5 to 1 in. long. *Inflorescence* terminal; panicles 1 to 5 in. long, dense; flowers clustered on branches hardly ·17 in. long; bracts inconspicuous, ·15 to ·2 in. long. *Calyx*-segments ·125 to ·2 in. long, linear. *Corolla* 1 in. long, white, pink-spotted; tube strongly bent close above the calyx and greatly inflated. *Capsule* 1 by ·125 in., many-seeded, dorsally compressed. *Seeds* ovoid, flattened, densely hairy. Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 325. *Cystacanthus* sp., Benth. in Benth. & Hook. f. Gen. Pl. II. 1098. *Meninia turgida*, Hook. Bot. Mag. t. 6043.

PENANG: *Deschamps*.—DISTRIB. Burma, Cochin-China.



19. ASYSTASIA, Blume.

Herbs or undershrubs. *Leaves* opposite, equal or nearly so. *Racemes* subterminal, unilateral, lax at base, sometimes compound; pedicels short (0 to .2 in. long), alternate or opposite, in bud and flower suberect; bract and 2 prophylla at base of the pedicel small bristles (hardly .125 in. long). *Calyx* .2 to .25 in. long, divided very nearly to the base into 5 linear or narrow-oblong segments. *Corolla* short or long; tube inflated upwards or linear; lobes 5, imbricated in the bud. *Stamens* 4, didynamous, all perfect; filaments united in pairs at the base, glabrous or slightly hairy near the base; anther-cells 2, oblong, parallel, at equal height, at base mucous or minutely auricled; pollen ellipsoid, longitudinally ribbed in the type species. *Ovary* hairy; style long, glabrous except near the base; stigmatic lobes 2 equal, hemiglobose; ovules in each cell 2. *Capsule* oblong, 4-seeded in the upper part; base contracted, sterile. *Seeds* compressed, round, often tubercled or rough, without hairs. Species 30, in South-east Asia, and in Tropical and South Africa.

Flowers alternate; inflated part of corolla-tube longer than the base .. .. 1. *A. coromandeliana*.  
Flowers mostly opposite; corolla-tube linear, widened near the top .. .. 2. *A. intrusa*.

1. ASYSTASIA COROMANDELIANA, Nees in Wall. Pl. As. Bar. III. 89 (1832). A more or less dull-pubescent herb, 1 to 4 ft. high. *Leaves* from 1 to 3.5 in. long, ovate, triangular-acute at tip, entire, the margin undulate or sometimes obscurely toothed; petiole .25 to 1.75 in. long. *Racemes* 1 to 4 in. long, rarely divided (paniculate), on a peduncle 1 to 4 in. long. *Sepals* .2 in. long, linear, pubescent. *Corolla* varying from lurid pale-purple to nearly white, 1 to 1.25 in. long (see however, remark on form  $\beta$  below); the contracted cylindric base of the tube much shorter than its inflated upper half. *Pollen* 75 by 45  $\mu$ , with 2 stopples, and longitudinal ribs beside each stopple. *Capsule* 1 in. long; solid cylindric base .35 in.; seeds .2 in. in diam., compressed, ovoid, wrinkled or subtubercular. Nees in DC. Prodr. XI. 165 (with syn. and var.); Miq. Fl. Ind. Bat. II. 792; Hook. f. Fl. Br. Ind. IV. 493 (with syn.); Dyer Fl. Trop. Afr. V. 131, Fl. Cap. V. 42. *A. gangetica*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 326, fig. 131; Prain Beng. Plants 813.

PENANG: Deschamps; Waterfall, King; John Scott. SINGAPORE: Deschamps; T. Anderson; Hullett 67.—DISTRIB. Indian Peninsula; Tropical and South Africa; elsewhere perhaps only a weed of cultivation.

There is no definite line between the examples of this species with small corolla (as John Scott's Penang example, with corolla only .75 in. long and small leaves) and the *A. chelonoides*, Nees. T. Anderson called our present plant *A. gangetica*; while he has twice marked the Java *A. chelonoides* (with subcompound inflorescence) as *A. coromandeliana*.

2. *ASYSTASIA INTRUSA*, Blume Bijdr. 796 (1825) (*excl. syn.*). A slender undershrub, 2 to 5 ft. high, sparingly pubescent. *Leaves* 2 to 3 in. long, elliptic-lanceolate; base obtriangular. *Racemes* 1 to 2 in. long; flowers often opposite. *Corolla* .7 to .75 in. long, dull pink; tube linear, widened only near the top. *Capsule* .75 in. long; seeds 4, tubercular. *Stamens, pollen, pistil*, nearly as of *A. coromandeliana*. Moritsi Verz. Zoll. Pfl. 47; Hassk. Cat. Hort. Bogor. p. 149 (*excl. syn.*); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 493; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900). *A. Blumei*, Nees in DC. Prodr. XI. 167; Miq. Fl. Ind. Bat. II. 793; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 326. *Isochoriste javanica*, Miq. Fl. Ind. Bat. II. 822; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 326.

PENANG: *J. Scott*; *Deschamps*; *Curtis* 2741; Waterfall, *Curtis* 1853, 3732. SINGAPORE: *Schomburgk* 72; *Hullett*; *Ridley* 3862.—  
DISTRIB. Frequent throughout the Malay Archipelago.

Nees altered the name of this plant, because he says that there existed an earlier *Asystasia intrusa* of Forskahl; Forskahl's name, however, was *Ruellia intrusa*.

## 20. PHIALACANTHUS, Benth.

Calyx-segments united into a tube at the base (very shortly so in *P. minor*). *Inflorescence* glabrous or very nearly so; pedicels spreading, with nodding flowers. *Capsule*, where known (*i.e.* in *P. Wrayi*), supported by the hardened elongate calyx-tube; otherwise as *Filetia*.—  
DISTRIB. Species 4, *viz.* the 3 below, and *P. Griffithii*, Benth., from East Assam.

Calyx-tube about as long as the teeth. Pollen with 12 raised strong longitudinal ribs .. .. 1. *P. Wrayi*.  
Calyx-tube shorter than the teeth. Pollen with very obscure longitudinal ribs:—

Corolla 1.25 in. long	..	..	..	..	2. <i>P. major</i> .
Corolla .6 in. long	..	..	..	..	3. <i>P. minor</i> .

1. *PHIALACANTHUS WRAYI*, C. B. Clarke, n. sp. A branched nearly glabrous shrub, 2 to 3 ft. high. *Leaves* opposite, equal; lamina 5 by 2 in., narrowed at either end, subentire; tip acuminate; rhaphides obscure; petiole .75 to 1 in. long. *Panicles* 2 to 4 in. long, terminal,

sometimes reduced to a simple raceme; bracts scarcely .1 in. long; pedicels 0 to .2 in. long, in opposite pairs. *Calyx* in flower .25 to .35 in. long; teeth triangular-lanceolate, acute; calyx in fruit hardening, lengthening (up to .5 in. and upwards). *Corolla* 1 in. long and upwards, pale primrose (Wray). *Stamens* 4; filaments glabrous, united in pairs; anthers sub-equal, the two cells ellipsoid-oblong, at equal height, hardly auricled at the base; pollen 80 by 15  $\mu$ , with 2 stopples, and 12 strong raised ribs. *Capsule* more than 1 in. long, oblong-ellipsoid, smooth, 4-seeded in the upper half; retinacula large.

PERAK: Gunong Summit, alt. 6700 ft., Wray 378.

*P. Griffithii*, Benth., has pollen exactly as of *P. Wrayi*, and is closely allied to it, but has a much more open and compound inflorescence.

2. *PHIALACANTHUS* MAJOR, C. B. Clarke, n. sp. A nearly glabrous shrub, 6 to 8 ft. high. *Leaves* opposite, equal; the blade up to 8 by 3 in., narrowed at each end; petiole more than 1 in. long. *Panicles* 2 to 5 in. long, terminal, sometimes reduced to a simple raceme; flowers opposite; pedicels .175 in. long, spreading; buds drooping. *Calyx* nearly .35 in. long, divided more than half-way down; teeth lanceolate. *Corolla* 1.25 in. long, waxy yellowish-white. *Stamens* nearly as of *P. Wrayi*, but the pollen only obscurely ribbed longitudinally. *Pistil* as of *P. Wrayi*.

PERAK: Scortechini 249; alt. 2500 to 4000 ft., King's Collector 8146, 10929.

3. *PHIALACANTHUS* MINOR, C. B. Clarke, n. sp. Very like *P. major*, but smaller in every part. *Leaves* smaller, sometimes only 3 by .7 in. *Calyx* divided nearly to the base, .2 in. long; segments linear. *Corolla* .8 in. long.

PERAK: Scortechini.

## 21. FILETIA, Miq.

Herbs or small shrubs. *Leaves* opposite, subequal, petioled, entire, with few or no raphides. *Panicle* symmetrically terminal, frequently reduced nearly to a raceme or spike; pedicels largely opposite; bracts small, inconspicuous, except in *F. bracteosa*. *Calyx* .175 to .25 in. long, divided nearly to the base into 5 narrow segments. *Corolla-tube* linear or cylindric, conspicuously 2-lipped; posticous lip erect, subentire; anticus of 3 oblong lobes. *Stamens* 4, perfect, subsimilar; anthers 2-celled, the cells oblong, muticous, one placed half-way below the other, or nearly at equal height; pollen short-ellipsoid, with 2 stopples, and longitudinally striate. *Pistil* glabrous, or hairy in the lower half of the style; ovules 2 in each cell; style shortly 2-fid, or with one

branch obsolete. *Capsule* stalked, with 4 smooth, flat seeds in the clavate upper part (where known).—DISTRIB. Species about 10, being those here described, the type *F. costulata* from Sumatra, *F. africana*, Lindau, and several from Borneo.

We have 3 divisions of *Filetia*:—

DIV. 1. EU-FILETIA.—Corolla-tube linear, .6 in. long; palate glabrous. Cells of the anthers quadrate, glabrous. Pollen with longitudinal lines.—*Filetia costulata*, Miq.

DIV. 2. PERAKIA.—Corolla-tube .4 in. long, cylindric; palate (usually densely) furred. Cells of the anthers oblong or narrow-oblong, the upper one fringed with hair. Pollen with longitudinal latticed bands.—Here belong the 4 species below described, and some of Malaya.

DIV. 2. AFRO-FILETIA.—Corolla-tube .125 to .175 of an inch long; palate glabrous. Anther-cells roundish, the lower divaricate.—Here belongs *Filetia africana*, Lindau.

Panicle spreading. Sepals small, acute, pubescent .. 1. *F. paniculata*.

Panicle reduced to a raceme or spike. Sepals glabrous, hardly acute:—

Bracts ovate, larger than the calyx .. .. 2. *F. bracteosa*.

Bracts inconspicuous:—

Flowers subsessile. Leaves elliptic or subovate .. 3. *F. Scortechinii*.

Flowers pedicelled. Leaves oblong .. 4. *F. Ridleyi*.

1. FILETIA PANICULATA, C. B. Clarke, n. sp. *Branches* (seen) 8 to 12 in. long, glabrate, woody below. *Leaves*: blade 4.5 by 2 in., elliptic, narrowed at either end, nearly glabrous; nerves 8 to 10 pairs; petioles .25 to .35 in. long. *Inflorescence* of 3, nearly simple, racemes 2 to 4 in. long; floral leaves at base of inflorescence .5 in. long, linear; flowers mostly in opposite separate pairs, on pedicels .125 in. long; bract at base of pedicel linear, .125 to .175 in. long. *Sepals* .175 in. long, linear, pubescent, acute. *Corolla* .7 in. long, yellowish, densely hairy down the throat (Scortechini). *Pollen* 70 by 40  $\mu$ , the longitudinal bands latticed. *Style* hairy at base; ovary nearly glabrous.

PERAK: *Scortechini* 604.

Scortechini marked correctly his *Filetias* as nov. genus next *Lepidagathis*.

2. FILETIA BRACTEOSA, C. B. Clarke, n. sp. Nearly glabrous. *Leaves*: blade up to 9 by 3 to 3.5 in., elliptic, narrowed at either end; nerves 12 pairs; petioles up to .7 in. long. *Inflorescence* a dense nearly simple spike 3 by .7 in.; flowers mostly in opposite pairs, nearly sessile; the bract ovate or nearly round, .2 in. long. *Sepals* .2 in. long, linear-ligulate, glabrous, hardly acute. *Corolla* and stamens nearly as of *F. paniculata*. *Style* hairy in the lower half. *Capsule* 1 in. long, with 4 seeds in the upper half (resembling the capsule of *Eranthemum*).

PERAK: *Scortechini* (none of the 4 sheets numbered).

3. *FILETIA SCORTECHINII*, C. B. Clarke, n. sp. A much-branching nearly glabrous undershrub. *Leaves*: blade in the typical collections of Scortechini 2·5 by 1 in., elliptic, rather oblique; nerves 5 to 6 pairs; petioles 0 to ·2 in. long; in Wray 1505 the leaves are 4·5 by 1·75 in., obovate with cuneate base (see also var.  $\beta$  below). *Inflorescence* a simple spike 2 to 3 in. long; flowers subsessile, in opposite pairs; bract ·125 to ·175 in. long, oblong. *Sepals* ·25 in. long, linear-ligulate, glabrous, hardly acute. *Corolla* ·7 in. long, white or pale yellow, furred in the throat but much less so than in *F. paniculata*. *Stamens* and pollen as of *F. paniculata*. *Style* slightly hairy at the base.

PERAK: *Scortechini*; alt. 4500 to 4900 ft., Wray 258, 1505.

VAR.  $\beta$  *evolutior*. *Branches* elongate, with long internodes. *Leaves*: blade up to 5·5 by 2·25 in.; nerves 8 pairs; petiole up to ·5 in. long. *Spike* elongate, loose; the lower pairs of flowers are far apart.

PERAK: *Scortechini* 306.

This may differ specifically; the flowers are exactly as of *F. Scortechinii* type.

4. *FILETIA RIDLEYI*, C. B. Clarke, n. sp. A much-branched nearly glabrous undershrub. *Leaves* 3 by ·75 in., oblong, narrowed at each end; margins undulate; petioles ·25 to ·35 in. long. *Raceme* 2 to 3 in. long, rather loose, with opposite pairs of pedicelled flowers; pedicels ·125 to ·175 in. long; bract oblong, shorter than the calyx. *Sepals* ·2 in. long, linear-ligulate, subobtusely, glabrous. *Corolla* ·7 to ·8 in. long, white, shaped as of *F. paniculata*. *Stamens* as of *F. paniculata*; the anther-cells rather narrower. *Style* thinly clothed with long white hairs. *Capsule* 1 in. long, clavate; the 4 seeds in the broadly obovate top.

PERAK: *Ridley* 9771.

## 22. LEPIDAGATHIS, Willd.

Herbs or shrubs. *Leaves* entire, undulate or crenate. *Inflorescence* of spikes, or of panicles narrowed almost to spikes, many-flowered; bracts secund, usually longer than the sepals, elliptic or narrow-lanceolate, acute; prophylla smaller than the bracts. *Calyx* divided nearly to the base into narrow-lanceolate segments, whereof 2 are often larger, 2 are sometimes connate at the base. *Corolla-tube* cylindric; limb 2-lipped; the 5 segments not very unequal. *Stamens* 4, subsimilar; anther-cells 2, parallel, oblong, often minutely mucronate at the base, at equal height or one slightly below the other; pollen small, ellipsoid, with longitudinal rows of large patches. *Stigma* nearly entire. *Capsule* small, 2- or 4-seeded, conic, hairy at top. *Seeds* flattened, orbicular, hygroscopically hairy on the margin or nearly glabrate.—Species 60, in the hotter regions of the Old World; 2 in America.

Lindau, in order to get *Lepidagathis* into a Tribe characterized by honeycombed pollen, advances the explanation that in *Lepidagathis* honeycomb bands are indicated by rows of points. I reckon honeycomb-pollen to be globose without longitudinal bands, and I do not esteem the pollen of *Lepidagathis* as honeycomb-pollen.

Flowers .5 in. long. Spikes rarely up to 3 in. long:—

Leaves 3 to 5 in. long. Spikes .5 to 1.5 in. long .. 1. *L. incurva*.

Leaves 6 to 7 in. long. Spikes 2 to 3 in. long .. 2. *L. chlorostachya*.

Flowers 1 to 1.3 in. long. Spikes 4 to 8 in. long:—

Upper bracts elliptic-lanceolate. Corolla pink-purple, 1 in.

long .. 3. *L. longifolia*.

Upper bracts linear. Corolla white, 1.3 in. long .. 4. *L. macrantha*.

1. *LEPIDAGATHIS INCURVA*, D. Don Prodr. Fl. Nepal. 119 (1825). *Stem* suberect, 1 to 2 ft. high, decumbent, rooting at base. *Leaves* 3 to 5 in. long, oblong, narrowed at each end, pubescent or nearly glabrate; margin often undulate; petiole .5 in. long. *Spikes* .5 to 1.5 in. long, oblong, axillary and terminal, erect, sessile, often clustered, ciliate, often softly hairy; bracts secund, nearly .5 in. long, lanceolate, mucronate; prophylla nearly .35 in. long, lanceolate, mucronate. *Sepals* 5, narrow-lanceolate, nearly .35 in. long, unequal. *Corolla* .25 in. long, white with brown spots on the palate. *Anther-cells* one slightly below the other, often minutely tailed. *Capsule* .2 in. long, conic, hairy at top. *Seeds* 4, flat, slightly hairy on the margin. Kurz in Flora LIII. 363 (1870). *L. hyalina*, Nees in Wall. Pl. As. Rar. III. 95 (1832), and in DC. Prodr. XI. 252; Miq. Fl. Ind. Bat. II. 815; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 521; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 313; Prain Beng. Plants 815. *L. cephalotes*, O. Kuntze Revisio I. 492. *Ruellia dependens*, Roxb. Fl. Ind. III. 49. *Hypoestes cephalotes*, Link Jahrb. III. 48.

PENANG: Curtis 2760, 3733; Ridley 2760, 7170, alt. 100 to 200 ft.; King's Collector 1292. KEDAH: Ridley 8319.—DISTRIB. Common throughout India; extending to China and Malaya.

2. *LEPIDAGATHIS CHLOROSTACHYA*, Nees in DC. Prodr. XI. 256 (1847). *Leaves* 7 by 2.25 in., elliptic-lanceolate, acuminate, attenuate at the base. *Spikes* often 2 to 3 in. long, broader than in *L. incurva*; otherwise as in *L. incurva*. T. Anders. in Journ. Linn. Soc. IX. 496 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 519.

PENANG: Pulo Poongah, Curtis 2941.—DISTRIB. Mergui, Griffith (K.D.) 6141.

This is a much larger plant than *L. incurva*; the bracts are longer and the spikes manifestly broader, but the corolla is hardly longer.

3. *LEPIDAGATHIS LONGIFOLIA*, Wight Ic. Pl. Ind. Or. t. 1564 (1850).

Shrubby, 3 to 6 ft. high. *Leaves* up to 9 by 2 in., lanceolate, acuminate at either end, glabrous; petioles .7 in. long. *Panicles* narrowed nearly to spikes, 6 to 8 in. long, pubescent; bracts lax, .75 by .35 in., elliptic, apiculate. *Sepals* nearly .5 in. long, lanceolate, unequal. *Corolla* "pink-purple" or "dull crimson," 1 in. long; tube at top subcampanulate. *Anther-cells* at equal height, minutely mucronate at the base; pollen of the genus. *Capsule* seen only young, promises to be conic, small. T. Anders. in Journ. Linn. Soc. IX. 499 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 523; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893).

MALACCA: Griffith (K.D.) 6138; Maingay (K.D.) 1751; Goodenough 1690. NEGRI SEMBILAN: Muar, Fox 11283. PAHANG: Ridley 2174. JOHORE: Ridley 11127; Curtis. PERAK: Scortechini 2038; Wray 1297; Goenong Panli, King's Collector 229; alt. 300 to 500 ft., King's Collector 3025, 10040. KOTA GLANGGI and PULAU TAWAR: fide Ridley. SELANGOR: Curtis 2362. SINGGA: Hullett 5718.

4. LEPIDAGATHIS MACRANTHA, C. B. Clarke, n. sp. *Bracts* lanceolate at top, the upper nearly linear, .75 by .125 in. *Corolla* white, very pubescent without, 1.3 in. long; otherwise as *L. longifolia*.

PERAK: alt. 300 ft., Wray 3385.

This may prove a variety only of *L. longifolia*, Wight; among the abundant collections of *L. longifolia* there is no specimen that matches *L. macrantha*.

### 23. BARLERIA, Linn.

Herbs or undershrubs, sometimes prickly. *Leaves* opposite or whorled, two of a whorl often reduced to spines. *Inflorescence* a terminal spike (in the Malay Peninsula plants); bract large; prophylla 2 or 0. *Calyx* large, of 4 distinct segments, 2 inner segments much the smaller. *Corolla* with a cylindric tube an inch or more long. *Stamens* 2, perfect; anther-cells 2, at equal height, muticous; pollen globose, honeycombed. *Ovary* with 2 to 1 ovules in each cell; stigmas 2, short. *Capsule* ovoid; seeds 2 to 4, large, shaggy with hygroscopic hairs or nearly glabrate.—Species 120, mostly in Africa and Tropical Asia, a few in America.

Leaves with interpetiolar spines.	Corolla yellow	..	..	1. <i>B. Prionitis</i> .
Spineless.	Corolla blue	..	..	2. <i>B. conspicua</i> .

1. BARLERIA PRIONITIS, Linn. Sp. Pl. 636 (1753). Glabrous or nearly so. *Stems* 1 to 3 ft. high. *Leaves* 2 to 5 by .3 to 1 in., elliptic, narrowed at both ends, mucronate; interpetiolar spines .25 to .75 in. long. *Inflorescence* terminal; lower flowers of the spike often a little distant; flower-bract lanceolate, widened at the base;

posticous sepal nearly .5 in. long, elliptic mucronate; anticous calyx-segment similar to the posticous sepal. *Corolla* yellow; tube hardly .5 in. long; posticous lip of 4 connate segments .7 in. long; anticous lip clawed, shorter. *Capsule* .5 to .7 in. long, 2-seeded. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 482 (*with syn.*); Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 314, tt. 105c, 106B, 125E; Dyer Fl. Cap. V. 46 (*with syn.*); Prain Beng. Plants 811, 812.

MALACCA: *Griffith*; *Ridley* 2696; *Harvey*; *Derry* 271.—DISTRIB. Africa, India.

This plant (with closely allied species) is abundant in Africa, and probably wild in Western India. In Eastern India it is cultivated, and found near villages. It may not be wild at Malacca.

2. *BARLERIA CONSPICUA*, Nees in Wall. Pl. As. Rar. III. 92 (1832). Large, sparingly pubescent, without spines. *Leaves* 8 by 2 in., oblong, acuminate at either end; petioles .5 in. *Spikes* 5 by nearly 1 in., loose, nearly continuous; bracteoles present, .7 in. long, linear-oblong, minutely strigose; outer sepals .7 in. long, lanceolate, one bifid at the top, with some yellow hairs. *Corolla* 1 in. long, blue. *Capsule* .75 in. long, narrowly oblong, glabrate, 4-seeded. *Seeds* ultimately nearly glabrate. Nees in DC. Prodr. XI. 226; T. Anders. in Journ. Linn. Soc. IX. 493 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 489. *Justicia conspicua*, Wall. Cat. 2460.

PENANG: *Wallich*.

## 24. *ERANTHEMUM*, R. Brown [Linn. *partim*].

Undershrubs, some very small. *Leaves* opposite, equal or nearly so, petioled, entire, often undulate or obscurely crenulate, nearly glabrous, usually pubescent at least on the midrib beneath. *Panicles* narrow, or reduced to apparent spikes, terminal in the species of the Malay Peninsula; bracts linear, inconspicuous, only in *E. caudifolium* so much as .25 in. long. *Calyx* .125 to .2 in. long (.25 in. long or more in *E. caudifolium*), divided to the base into linear segments, pubescent, ultimately often glabrate. *Corolla* showy, white or colorate; tube linear (except in *E. breviflos*); segments 5, quadrate-elliptic, subequal, spreading, more or less one-sided. *Stamens* 2; filaments very short; anthers in the mouth of the tube or just exsert, of 2 parallel oblong muticous cells placed at equal height; pollen shortly ellipsoid or subglobose, with 2 stopples and 6 to 10 longitudinal bands, often obscure. *Ovary* with 2 ovules in each cell; style with 2 subequal minute lobes. *Capsule* with a linear-cylindric base, and 2 to 4 seeds in the much-widened upper half. *Seeds* ovoid, flattened, glabrate, corrugate.—DISTRIB.



Species 90 (after Mackaya has been taken out), mainly in South-east Asia and Oceania; a dozen species in Tropical Africa with Madagascar, and a few in Tropical America.

- Pistil clothed with brown hairs. Flowers .75 in. long .. 1. *E. hirtipistillum*.  
Pistil with a few patent thin hairs or glabrate:—  
Corolla-tube .5 to .6 in. long:—  
Spikes 3 to 6 in. long; lower flowers solitary, distant .. 2. *E. porphyranthos*.  
Panicles 1.5 in. long, of 6 to 12 small flowers .. 3. *E. breviflos*.  
Panicles long, dense; flowers clustered or cymulose:—  
Sepals .125 to .25 in. long; leaf-base attenuate .. 4. *E. caudifolium*.  
Sepals scarcely .125 in. long; leaf-base obtuse .. 5. *E. selangorense*.  
Corolla-tube 1 to 1.3 in. long:—  
Panicle often reduced to an apparent spike:—  
Flowers white:—  
Panicle of elongate, interrupted spikes .. 6. *E. album*.  
Spikes dense. Flowers clustered .. 8. *E. Kingii*.  
Flowers coloured:—  
Flowers solitary, all close in a continuous spike .. 7. *E. malaccense*.  
Flowers in whorls, the lower standing apart .. 9. *E. acuminatissimum*.  
Panicle with lower branches .175 in. long, carrying  
small cymes .. .. 10. *E. Teijsmanni*.

1. *ERANTHEMUM HIRTIPISTILLUM*, C. B. Clarke, n. sp. Erect, 2 ft. high, pubescent. *Leaves* up to 8 by 3 in., elliptic-acuminate, base sub-obtuse, fuscous beneath, pubescent on both surfaces; primary nerves 10 pairs; petiole 1.5 in. *Inflorescence* of 3 to 1 panicles reduced to spikes, 4 to 9 in. long; flowers in clusters of 1 to 5, opposite, mostly .25 to 1 in. apart; bracts linear, .175 in. long. *Sepals* .2 in., linear, very pubescent. *Corolla* pale pink; tube .5 in. long; lobes hardly .3 in. long. *Stamens* and pollen of the genus; the filaments and anthers slightly hairy. *Ovary* and style-base clothed with erect brown hairs. *Capsule* nearly 1 in. long, with 4 seeds in the hairy top, constricted between the pairs of seeds. *Seeds* of the genus.

PERAK: *Wray* 1399.

2. *ERANTHEMUM PORPHYRANTHOS*, C. B. Clarke, n. sp. A sparingly hairy, suberect, simple-stemmed undershrub, 1 to 2 ft. high. *Leaves* very variable in size; blade sometimes 7 by 2.5 in., sometimes 2 by .7 in., elliptic-lanceolate-acute; base cuneate; margin often undulate, sub-crenulate; lower surface nearly glabrous or pubescent on the midrib, often when dry whitened; primary nerves 6 pairs; petioles .25 to .3 in. long. *Inflorescence* a linear spike, 3 to 6 in. long (but see var.  $\beta$ ); flowers sessile, in opposite pairs, the lower pairs .25 to .35 in. (and upwards), distant; bracts linear, hardly .175 in. long. *Sepals* .15 in. long, linear, minutely pubescent. *Corolla* purple, or light purple, or "white

tinged carnation" (Scortechini); tube .5 in. long, linear, very slender, the upper .175 in. widened, oblong; lobes elliptic, .35 in. long. *Stamens* of the genus. *Style* slightly hairy near the base. *Capsule* .7 in. long, with 4 seeds in the top, minutely pubescent, constricted between the pairs of seeds; seeds corrugated, subscabrous. *E. crenulatum*, Nees in DC. Prodr. XI. 453 (a partly). *E. malaccense*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498 (partly).

PENANG: *Ridley*; *Deschamps*; *Curtis* 499. MALACCA: *Cuming* 2357. PERAK: *Scortechini* 114, 543, 564; *Larut* Perak, alt. 1000 to 1500 ft., *King's Collector* 3907.

The very slender short tube of the corolla, having an oblong dilatation in the upper third of it, marks this species off from most *Eranthemums*.

VAR.  $\beta$  *evolutior*, C. B. Clarke. *Panicle* of numerous elongate spikes, with additional spikes from the leaf-axils; *corolla-tube* up to .7 in. long.

PENANG: Waterfall, *Curtis* 348.

3. *ERANTHEMUM BREVIFLOS*, C. B. Clarke, n. sp. A small, woody, crooked-stemmed, branched, nearly glabrous undershrub, 4 to 8 in. high. *Leaves* 4 by 1.75 in., elliptic, shortly narrowed at each end; nerves 6 pairs; midrib beneath glabrate in the mature leaf; petioles .25 to .75 in. long. *Inflorescence* a panicle 1.5 in. long, of 6 to 12 flowers, nearly glabrate, on a peduncle .5 in. long; pedicels 0 to .175 in. long; bracts minute, setaceous. *Sepals* .125 in. long, linear, when young minutely pubescent. *Corolla* "grey"; tube .25 in. long, cylindric. *Stamens* and pollen of *Eranthemum*, glabrous. *Capsule* .8 to .9 in. long, linear-oblong; seeds 4, in the upper part, nearly smooth.

PERAK: *Goping*, *King's Collector* 518.

This plant appears closely allied in habit to *E. album*; the short cylindric corolla-tube and linear-conic capsule (not suddenly narrowed into a cylindric stalk) with smooth seeds, suggest that it may belong to a different genus.

4. *ERANTHEMUM CAUDIFOLIUM*, C. B. Clarke, n. sp. A shrub, 4 to 5 ft. high, branched upwards, sparingly pubescent. *Leaves*: blade 7.5 by 2.5 in., elliptic, acuminate at either end, with a linear caudate tip (in *Scortechini* n. 447), but in other examples leaves are seen narrower with a shorter tip; nerves 7 to 8 pairs; petioles of the lower leaves often 2 to 2.5 in. long, of the upper only .25 in. *Inflorescence* a narrow dense panicle 6 by 2 in., with brown pubescence; lateral branches hardly .2 in. long, carrying small dense cymes; bracts .35 in. long, linear, setaceous. *Sepals* .175 to .25 in. long, linear, caudate. *Corolla* white (*Curtis*); tube .5 to .6 in. long, often curved towards the top; segments .2 in. long. *Stamens* of the genus. *Pistil* and style

very thinly hairy. Capsule 1 in. long, with 4 seeds in the upper part.

PERAK: *Scortechini* 447, 1531; *Curtis* 3150, 3341. DINDINGS: *Ridley* 3066 *bis*.

There are abundant collections and a detailed MS. description of this plant by *Scortechini*. It is easily recognized by the small flowers with a large capsule, sometimes more than an inch long.

5. *ERANTHEMUM SELANGORENSE*, C. B. Clarke, n. sp. A branched shrub, minutely pubescent. *Leaves*: blade 5 to 6 by 2·5 in., elliptic-acuminate; base obtuse or rounded. *Panicle* 3 by 1 to 2 in.; lower branches sometimes much developed, 1 in. long, carrying 3 to 6 flowers. *Sepals* scarcely ·175 in. long. *Corolla-tube* ·6 in. long. Otherwise as *E. caudifolium*.

SELANGOR: Sungu Bulu, *Goodenough* 10547; Kwala Lumpor, *Curtis* 2367.

6. *ERANTHEMUM ALBUM*, Nees in DC. Prodr. XI. 455 (1847). A nearly glabrate undershrub, 1 to 3 ft. high. *Stem* usually lignescent, with white bark, to the very base of the inflorescence. *Leaves* opposite, subequal; blade 5·5 by 2·5 in., shortly acuminate at either end, often whitened underneath; margins often obscurely undulate, crenulate; nerves 7 pairs; petioles ·5 to 1 in. long. *Inflorescence* a panicle of many thin spikes, 4 to 8 in. long (poor examples with one spike occur); flowers mostly solitary, in distant pairs, the lower ·25 in. apart or more; bracts linear, ·175 in.; pedicels 0 to ·175 in. (*i.e.*, the spike is itself a contracted panicle). *Sepals* ·175 in. long, linear, minutely pubescent. *Corolla* white; tube 1 to 1·3 in. long, linear, exactly the same width to the top. *Stamens* and pistil glabrous; pollen subglobose, 30  $\mu$  in diam., lightly banded longitudinally. *Capsule* 1 in. long, glabrous or scarcely microscopically puberulous, 4-seeded near the top, slightly contracted between the pairs of seeds. *Seeds* corrugated. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498; *Ridley* in Journ. As. Soc. Straits 121 (Singapore 1900); *Prain* Beng. Plants 814. *E. diversifolium*, Miq. Fl. Ind. Bat. II. 837. *E. crenulatum*, Nees in DC. Prodr. XI. 453. Var. *a* (*partim*), 454; Var.  *$\gamma$  angustifolia* (*partim*). *Justicia alba*, Roxb. Fl. Ind. ed. Carey & Wall. I. 117 (1820); Ic. Ined. 1105 in hb. Kew. *J. orbiculata*, Wall. Cat. 2489 B.

MALACCA: *Griffith*. MALAY PENINSULA: *Griffith* (K.D.) 6175 (*partly*).—DISTRIB. Chittagong; Pegu; abundant in the Andamans and Nicobars; Malaya.

Nees' type example of his *E. Zollingerianum*, viz. Zollinger 162 in Java lectus, is in Kew, but is not this. In the large examples the panicle has many long curved spikes,

the second flowers all turned to the convex side of the spike. The smaller forms (?), i.e. *J. orbiculata*, Wall., have a single straight spike.

7. *ERANTHEMUM MALACCENSE*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498 (1884) (*tab. et syn. excl.*). *Innovations* pubescent. *Stem* up to 4 to 5 ft. high, often branching. *Leaves*: blade 5·5 by 1·25 in., lanceolate or narrow, elliptic-lanceolate, acute at either end; nerves 7 pairs, oblique; petioles ·175 to ·35 in. long. *Flowers* subsessile, numerous, close together in a spike nearly continuous to its base, mostly solitary, opposite; spikes 2 to 3 in. long, one or several at the end of each branch; pedicels rarely up to ·075 in. long; bracts hardly longer than the pedicels. *Sepals* about ·075 in. long, narrow, pubescent. *Corolla* of one colour, variously noted as violet, purple, pink, pink-yellow, yellow-green; tube 1·125 in. long, linear to the top. *Stamens* of the genus. *Pistil* with few patent thin hairs or subglabrate. *Capsule* (in a Yunnan plant referred here) ·7 in. long, clavate, 4-seeded, very nearly glabrous. Ridley in Trans. Linn. Soc., ser. 2, III. 333 (1893). *E. erectum*, T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 286 (1868). *E. crenulatum* var. *grandiflora*, T. Anders. l.c. *E. Blumei*, T. Anders. l.c. (non Nees). *E. crenulatum*, Nees in Wall. Pl. As. Rar. III. 107 (*in large part*), and in DC. Prodr. XI. 523 (*in part, not of Lindley*). *Pseuderanthemum malaccense*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 330.

PROVINCE WELLESLEY: *Curtis* 203; *Ridley* 2231. KEDAH: Langkawi Island, *Curtis*; *Ridley* 8335. MALACCA: common, fide *Ridley*; *Griffith* (K.D.) 6175; *Cuming* 2389; *Harvey*; *Goodenough* 1713; *Holmbury* 732; Mt. Ophir, *Lobb*. PERAK: alt. 500 ft., *King's Collector* 8567, 8626, 8665; *Curtis* 3327. PEKAN: fide *Ridley*. JOHORE: *Curtis*.—DISTRIB. Siam.

This species, abundant in its area, is characterized by the uniform inflorescence, and is always collected in flower. *E. palatiferum*, Bot. Mag. t. 5957, of which (in Fl. Br. Ind. IV. 498) I referred one piece to *E. malaccense*, is undoubtedly all true *E. palatiferum*, of which it has the characteristic inflorescence; the colour of the flowers varies from pale pink to bluish purple in both species. The name *E. erectum*, T. Anders., is older than *E. malaccense*, but was published without one word of description.

8. *ERANTHEMUM KINGII*, C. B. Clarke, n. sp. *Branches* elongate, with long internodes. *Leaves* elliptic, shortly acuminate at the tip, hardly acuminate at the base, paler beneath when dry. *Spikes* solitary, 2 to 4 in. long, dense; the lower axils with 1 to 3 flowers in each axil. *Corolla* white; tube 1·125 in. long. Otherwise as *E. malaccense*, C. B. Clarke.

JOHORE: *Jaffaria*, *King*. SINGAPORE: *Hullett* 810.

The leaves of this species resemble those of *E. album*, Nees, while the spikes resemble those of *E. malaccense*, but are slightly more pubescent, and the corolla is white.

9. *ERANTHEMUM ACUMINATISSIMUM*, Miq. Fl. Ind. Bat. II. 835 (1856). Erect, nearly glabrous. *Leaves*: blade 8·5 by 2 in., acuminate-attenuate at either end; nerves 8 pair, oblique; raphides on the upper surface numerous, very short; petioles 1 in. *Spikes* 1 to 3, 7 to 10 in. long, many-flowered, the lower clusters half-whorled, ½ to 1 in. apart, with 5 to 10 flowers to the whorl; the upper whorls fewer-flowered, coalescent; bracts ½ in. long, lanceolate-linear. *Sepals* ½ in. long, nearly linear, ultimately nearly glabrous. *Corolla* white, with one segment purple-spotted; tube 1·25 in. long. *Stamens* of the genus. *Capsule* 1·125 in. long, with 4 seeds in the upper part, slightly constricted between the seeds. *E. Andersoni*, Masters in Gard. Chron. 134, 136 (1869); Bot. Mag. t. 5771; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 499; Ridley in Trans. Linn. Soc., ser. 2, III. 333 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. elegans*, Masters in Gard. Chron. 1234 (1868) (not of R. Brown). *E. Blumei*, Hassk. Cat. Hort. Bogor. 151; T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 285 (1868), and in Journ. Linn. Soc. IX. 523 (1867); Kurz in Flora LIII. 363 (1870) (not of Miquel). *E. diantherum*, Blume Bijdr. 793 (not of Roxb.). *E. aspersum*, Hook. Bot. Mag. 5711. *Pseuderanthemum Andersoni*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 330.

SINGAPORE: *T. Anderson* 112. JAVA: cult. in Hort. Bogor. (*Kurz* 379). *Ridley, l. c.*, thinks the Singapore collection was probably a garden escape.

The "type" of *E. acuminatissimum*, Miquel, from Utrecht, proves identical with the *E. Andersoni*, Masters. It was, perhaps, *E. viscidum*  $\beta$  *acuminatissimum*, Hassk. Hort. Bogor. p. 151, but not *E. viscidum*  $\beta$  Blume. The *E. Blumei*, Miq. (Fl. Ind. Bat. II. 836) is before me, and very closely allied to *E. acuminatissimum*, but has (as Miquel says) smaller leaves, smaller bracts, and smaller calyx.

10. *ERANTHEMUM TEIJSMANNI*, T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 285 (1868). "A shrubby creeper, 8 to 12 ft. long" (King's Collector). *Branches* ½ in. in diam., with numerous secondary branches springing at a right angle. *Leaves*: blade 6 by 2 in., broad-oblong, acuminate; nerves 6 pair; base often rounded or truncate, but on the same branch sometimes cuneate-oblique; petioles ½ to 1·25 in. long. *Inflorescence* a narrow, many-flowered panicle rarely so much as 6 in. long; the lower branches hardly ½ in. long, carrying small cymes (almost clusters) of flowers. *Calyx* and *corolla* (white tinged blue) as of *E. acuminatissimum*, Miq. *E. Blumei*, Hort. Buitenzorg viz Miquel. *E. crenulatum* ? var., T. Anders. MS.

PERAK: *Scortechini* 1356; Tapa, alt. 2000 to 3000 ft., *Wray* 837; *King's Collector* 2176; Larut, alt. 5000 to 800 ft., *King's Collector* 5489. MALACCA: H.D. 364.

T. Anderson's whole diagnosis of his *E. Teijsmanni* is "a fine species with a straggling habit"; and I have no authentic specimen; the name is disposable. Whether this was the imperfectly known *E. graciliflorum*, Nees (Wall. Pl. As. Rar. V. 3, 107), from Penang I cannot say; it is not the *E. graciliflorum* of Madura (Java) distributed from the Buitenzorg Garden. This species resembles much *E. hirtipistillum* (collected at the same locality), but the corolla-tube is here 1.3 to 1.5 in. long.

## 25. CLINACANTHUS, Nees.

A rambling shrub. *Flowers* conspicuous, in small drooping cymes at the ends of the branches; bracts and prophylla small, linear. *Sepals* 5, equal, linear. *Corolla-tube* narrow, funnel-shaped; limb 2-lipped. *Stamens* 2; anthers of 1 cell, oblong, muticous; pollen ellipsoid, with 2 longitudinal bands. *Style* very shortly 2-fid. *Capsule* stalked, 4-seeded. Only 1 species.

1. CLINACANTHUS BURMANNI, Nees in DC. Prodr. X. 511 (1847). *Stems* round. *Leaves* glabrate; blade 3 by .5 to .8 in., elliptic-lanceolate or lanceolate, entire or crenate; base obtuse or attenuate; petiole .25 in. long. *Cymes* pubescent, 5- to many-flowered; bracts .125 in. long. *Sepals* .25 in. long, minutely hairy. *Corolla* orange-red or dull scarlet, 1.25 in. long, lobed one-third to half-way down. *Stamens* glabrous, no rudiments. *Style* glabrous. *Miq.* Fl. Ind. Bat. II. 854; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 524; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 340; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890). *C. nutans*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 340. *Justicia nutans*, Burm. Fl. Ind. 10, t. 5, fig. 1. *J. fulgida*, Blume Bijdr. 784. *Beleropone ? fulgida*, Hassk. Cat. Hort. Bogor. 151.

MALACCA: Maingay 1977 (K.D. 1180); Songkah, Curtis 2904.—  
DISTRIB. Siam, Borneo, Hainan.

## 26. JUSTICIA, Linn.

Herbs or shrubs. *Leaves* opposite, subequal or sometimes pseud-alternate, entire or undulate. *Inflorescence* various in the different sections, from strobilate spikes to panicles with the flowers all pedicelled; bracts and prophylla small, linear, sometimes lanceolate, or in the strobilate spikes round, large, imbricate (these large round bracts in many cases cover more than one flower, and are then floral leaves). *Calyx* small, deeply 5-fid (4-fid in Sect. ROSTELLARIA). *Corolla-tube*

shorter (or scarcely longer) than the 2-lipped limb; segments imbricated (not twisted) in the bud. *Stamens* 2; anther-cells 2, one below the other, tailed; pollen ellipsoid, small, longitudinally ribbed beside the stopples. *Ovary* 4-celled; style shortly bifid. *Capsule* regularly dehiscent; 4-seeded (the placentæ not springing elastically from the base of the capsule), stalked with the seeds in the top, or seed-bearing nearly from the base. *Seeds* ovoid, flattened, verrucose, subtubercular, glabrous (except in Sect. RHAPHIDOSPORA).—DISTRIB. Species 150, widely spread throughout the hot regions of the world.

This genus is only artificially separated from several others (as from *Leda Adhatoda*, *Ptyssiglottis*) by the white tail to the lower anther-cell. If this character be not regarded as of generic importance, the number of species may be 300, as in the arrangement by Lindau in Engl. & Prantl Pflanzenfam.

Sect. 1. BRACEATÆ. Bracts (floral leaves) round, large, strobilate at least in the young spikes :—

Flowers mostly solitary under each bract (floral leaf) :—

Corolla glabrous without, except a few hairs at the tip .. 1. *J. ptychostoma*.

Corolla hairy without :—

Nerves of the leaves 6 to 7 pairs :—

Leaves mostly cuneate at the base .. 2. *J. pubiflora*.

Leaves rounded at the base .. 4. *J. Scortechinii*.

Nerves of the leaves 10 to 11 pairs .. 3. *J. patulinervis*.

Flowers 2 to 3 or more clustered under each bract :—

Bracts .5 in. long, including the petiole .. 5. *J. subcymosa*.

Bracts .6 in. long, subsessile .. 6. *J. selangorensis*.

Sect. 2. CALOPHANOIDES. Flowers axillary, cymose, solitary or clustered; without a terminal cyme or panicle. Corolla small :—

Leaves opposite, subequal :—

Leaves elliptic .. 7. *J. quadrifaria*.

Leaves linear-oblong .. 8. *J. Neesiana*.

Leaves apparently alternate, *i.e.* one of each pair 0 or minute, deciduous :—

Leaves on the nerves beneath and stem nearly glabrous :—

Herb, with long internodes .. 9. *J. henicophylla*.

Much-branched shrub .. 10. *J. subalternans*.

Leaves on the nerves beneath and stem hairy .. 11. *J. alternifolia*.

Leaves one of each pair reduced to a persistent ear .. 12. *J. otophora*.

Sect. 3. GENDARUSSA. Spikes terminal, and terminal on short axillary branches; bracts mostly narrow, the lowest rarely imbricate :—

Leaves narrow-oblong or lanceolate :—

Spikes dense; flowers clustered .. 13. *J. Gendarussa*.

Spikes lax; flowers mostly solitary .. 14. *J. Maingayi*.

Leaves elliptic, large (5 to 8 in. long) :—

Peduncles short :—

Spikes linear, interrupted .. 15. *J. vasculosa*.

- Spikes dense .. .. 16. *J. uber*.  
 Peduncles long; carrying panicles of linear spikes .. 17. *J. sumatrana*.  
 Sect. 4. *ROSTELLULARIA*. Spikes cylindric; bracts narrow, about as  
 long as the calyx. *Calyx* of 4 linear segments, the 5th suppressed:—  
 Corolla .25 to .35 in. long .. .. 18. *J. procumbens*.

*Justiciain conspicua*, Dayd.-Jack. Ind. Kew., is a bare name, founded on Wall. Cat. n. 2475. The "type" of this came from Penang; but Wallich sorted with it, doubtfully, one plant from hb. Wight, another from Silhet. I have not found n. 2475.

1. *JUSTICIA PTYCHOSTOMA*, Nees in Wall. Pl. As. Rar. III. 108 (1832). A herb, very sparingly pubescent. *Stem* 1 to 4 ft. high, branching; internodes 3 to 6 in. long. *Leaves* 6.5 by 2.25 in., elliptic-lanceolate, acuminate at tip, cuneate at base (but see the Varieties below), often undulate or obscurely crenate on the margin, with very small raphides on both surfaces; primary nerves 7 to 9 pairs, oblique; petioles .5 to 1.5 in. long; opposite pairs of leaves equal or rarely somewhat unequal. *Peduncles* terminal, penultimate, or axillary, 1 to 2 in. long, frequently 2 from one axil; spike 1 in. long, or lengthening to 1 to 4 in. long; bracts round, ovate, green, .3 to .35 in. long, shortly stalked, very caducous, nearly glabrous, but often with white bristles on the margin; with 1 (rarely 1 to 2) flower under each bract. *Calyx* .125 in. long, nearly glabrous; segments linear. *Corolla* lurid white-yellow marked with purple grey lines; corolla before expansion nearly .5 in. long, glabrous without, or with a few hairs at the very tip. *Filaments* glabrous; anther-cells round, one lower than the other with a short conic white tail; pollen small, ellipsoid, 30  $\mu$  long, with two stopples and two rows of tubercles (or round patches) on each side of the stopple. *Pistil* glabrous; style very shortly 2-fid. *Capsule* .5 in. long, glabrate, 4-seeded. *Seeds* flattened, verrucose, subtubercled. T. Anders. in Journ. Linn. Soc. IX. 517 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. 4 534 (*emend.*). *Rhytiglossa ptychostoma*, Nees in DC. Prodr. II. 337. *R. ptychosperma*, Miq. Fl. Ind. Bat. II. 825.

PERAK: *Scortechini* 689; *Wray* 2046; alt. 100 ft., *King's Collector* 2077. PENANG: *Porter* (Wall. Cat. 2478). KEDAH: *Curtis* 2117.

VAR.  $\beta$  *angustifolia*, C. B. Clarke. *Leaves* lanceolate or linear-lanceolate.

PERAK: alt. 5000 ft., Gunong Inas, *Wray* 4130.

VAR.  $\gamma$  *rotundifolia*, C. B. Clarke. *Leaves* 6 by 3.5 in., rounded at the base.

PERAK: *Ridley* 7163.

VAR.  $\delta$  *auriculata*, C. B. Clarke. *Leaves* narrowly, unequally cordate at base, with two ears.

PERAK: alt. 500 ft.; *King's Collector* 2062; *Scortechini*.



This is a striking var.; some of Scortechini's examples show on the same stem leaves acute at base and leaves auricled at base.

VAR.  $\epsilon$  *parvibracteata*, C. B. Clarke. *Spikes* interrupted at base; bracts very small, round, long-petioled, spreading, hardly (or not) imbricated.

PERAK: *Ridley* 7166; *Goping*, *King's Collector* 555.

Wallich's (one) type sheet of this is very imperfect, as can be inferred from Nees' description, and my account in Hook. f. Fl. Br. Ind. is erroneous both as to the bracts and the synonymy.

2. *JUSTICIA PUBIFLORA*, C. B. Clarke, n. sp. *Leaves* 4 to 6 in. long, elliptic-lanceolate, cuneate or rounded at the base; nerves 6 pairs; raphides none (or most obscure) on either surface. *Peduncles* terminal, and a few axillary; bracts (floral leaves) round-ovate, green, .35 in. long, shortly stalked, pubescent, without white bristles on the margin. *Calyx* pubescent. *Corolla* very hairy without. *Style* at base slightly hairy. *Anther-cells* short-ellipsoid, the lower with a medium ovoid tail; pollen ellipsoid; pores 2; one longitudinal row of tubercles on either side of each pore. Otherwise resembling *J. ptychostoma*, Wall.

PERAK: alt. 4000 ft., *King's Collector* 3671; *Scortechini*.

3. *JUSTICIA PATULINERVIS*, C. B. Clarke, n. sp. Sparingly pubescent. *Leaves* 6 by 4 in., crenate, truncate at base, very shortly cuneate on the petiole; nerves 10 to 11 pairs, spreading at right angles from the midrib. *Spike* dense; bracts nearly glabrate, with some white bristles on the margin. *Corolla* hairy without. Otherwise as *J. pubiflora*.

PERAK: *Scortechini*.

4. *JUSTICIA SCORTECHINII*, C. B. Clarke, n. sp. *Leaves* 3 to 4 in. long, ovate or elliptic-acuminate, most of them rounded at the base, crenulate; nerves 6 to 7 pairs, without raphides. *Spikes* dense; bracts round-ovate, imbricate, somewhat pubescent, not bristle-ciliate. *Corolla* hairy without. *Capsule* hairy, nearly to the base. Otherwise as *J. pubiflora*.

PERAK: *Scortechini* 41, 387.

The leaves have dried a rich brown in all the nine sheets of *Scortechini*. so that they look very unlike the preceding three species.

5. *JUSTICIA SUBCYMOSA*, C. B. Clarke, n. sp. *Stem* 2 to 5 ft. high. *Leaves* ovate-acuminate, up to 9 by 5½ in., mostly obtuse at the base; nerves 11 pairs; petioles 1 to 2 in. long. *Inflorescence* up to 9 by 1 in.; bracts .5 in. long (petiole included), ovate, at first imbricated, in fruit often distant patent; a condensed cyme of 3 to 7 flowers under each floral leaf. *Sepals* hardly .125 in. long, pubescent. *Corolla* pale

yellow, .5 in. long, hairy without. *Capsule* nearly .7 in. long, hairy to the base. *Stamens* and pistil nearly as of *J. ptychostoma*.

PENANG: *Curtis* 1765. PERAK: *Scortechini*; alt. 500 to 1000 ft., *King's Collector* 5766, 10244. SELANGOR; *Ridley* 7593.

A larger plant than the four preceding. It has been supposed allied to *J. decusata*, Roxb., but the pseudo-spikes do not branch.

6. *JUSTICIA SELANGORENSIS*, C. B. Clarke, n. sp. *Leaves* 9 by  $4\frac{1}{2}$  in elliptic, shortly acuminate, rounded or cuneate at the base, dark purple (*Ridley*); nerves 9 to 10 pairs, oblique; petioles 2 to 4 in. long. *Peduncles* .75 in. long; spikes 4 by 1.25 in., slightly pubescent; bracts ovate or obovate, up to .6 in. long, subsessile, glabrate, imbricate, purple (*Ridley*), with 2 or 3 flowers under each. *Calyx* small, glabrate. *Corolla* white (*Ridley*). *Capsule* hardly .35 in. long, glabrate.

SELANGOR: *Ridley* 7587.

I have seen no flowers. This may be near the group of *J. burmanica* and *J. Atkinsoni*.

7. *JUSTICIA QUADRIFARIA*, Wall. Cat. 2479 (1828-49). *Branches* 2 to 3 ft. long, little divided, pubescent. *Leaves* opposite, subequal, somewhat pubescent, at least on the midrib; blade elliptic, 2 to 4 in. long, acuminate at either end, entire; petiole 0 to .35 in. long. *Flowers* densely clustered in the axils, sometimes in small heads on short axillary peduncles; bracts (rather floral leaves) spatulate, rusty-pubescent, occasionally present. *Sepals* .25 in. long, linear, pubescent. *Corolla* .25 to .35 in. long, white with rose spots. *Stamens* 2; anther-cells 2, one below the other, tailed; style glabrous. *Capsule* .25 in. long, glabrate or minutely pubescent; solid pedicel very short; seeds 4, verrucose-tubercular. T. Anders. in Journ. Linn. Soc. IX. 514 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 530; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 246 (1890). *J. Zollingeriana*, C. B. Clarke, l.c. *Gendarussa quadrifaria*, Nees in Wall. Pl. As. Rar. III. 105. *Adhatoda quadrifaria* and *Neesiana*, Nees in DC. Prodr. XI. 396.

SINGAPORE: *Hullett* 156. SELANGOR: *Curtis*.—DISTRIB. Khasia, Tenasserim, Sumatra, China.

8. *JUSTICIA NEESIANA*, T. Anders. in Journ. Linn. Soc. IX. 513 (1867). *Leaves* oblong or linear-lanceolate, 1.5 by .25 in. in the type examples, but (in Wray 3538) attaining 4 by .75 in. *Sepals* hardly .175 in. *Corolla* .25 in. long. Otherwise as *J. quadrifaria*, Wall. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 531. *Gendarussa Neesiana*, Wall. Cat. 7175; Nees in Wall. Pl. As. Rar. III. 105. *Adhatoda Neesiana*, Nees in DC. Prodr. XI. 397.

PERAK: *Scortechini* 38, 1304; alt. 300 ft., *Wray* 3538. BUNGAL R.: *Lobb*.—DISTRIB. Amherst.

*Scortechini*, n. 38, and *Lobb*'s example agree with the Wallichian Amherst plant. *Wray*'s example is much larger, and from description is not separable from *J. salicifolia*, T. Anders. (see Fl. Br. Ind. IV. 531), a Khasia plant, which, however, it does not match. As stated in the Fl. Br. Ind. IV. 530, *J. Neesiana* should be esteemed only a var. of *J. quadrifaria*.

9. *JUSTICIA HENICOPHYLLA*, C. B. Clarke, n. sp. A herb, 1·5 to 4 ft. high, nearly glabrous. *Leaves* apparently alternate, attaining 9 by 3·5 in., often only half these dimensions, elliptic or ovate, acuminate, acute; base cuneate, not rarely unequal, with one side rounded or almost cordate; primary nerves 7 pairs; petioles 0 to ·25 in. long. *Inflorescence* of axillary peduncled cymes, sometimes small few-flowered, sometimes compound 40-flowered (but less than half the length of the leaf); bracts and prophylla minute. *Sepals* 5, linear, ·175 in. long, pubescent. *Corolla* a greenish cream-colour, the palate marked with rose-purple, ·35 in. in length, pubescent without; altogether as of a *Justicia*. *Stamens* 2; filaments glabrous; cells of anthers 2, ellipsoid, one (half its length) below the other with a white tail; pollen ellipsoid, 30  $\mu$  long, with 2 stopples, and a longitudinal row of patches on either side of each stopple. *Style* hairy, shortly 2-fid at top. *Capsule* ·7 in. long, glabrate; base cylindric, with 4 seeds in the upper (widened) part; seeds glabrous, granular-scabrid.

The numerous examples here collected may include more species than one; some (*King's Collector* 2189, *Curtis* 1342) have dried green; others (*Wray* and *Scortechini*) have dried red tinged black. The leaves in some are shortly acuminate, in others long acuminate. The base of the leaf varies greatly on one branch.

PERAK: *Curtis* 1342; *Wray* 1402, 2751; *Scortechini*; alt. 500 ft., *King's Collector* 2189, 10297.

VAR.  $\beta$  *caudata*, C. B. Clarke. *Leaves* very unequal at the base; the tip caudate, curved on one side.

PERAK: *Goping*, alt. 500 to 800 ft., *King's Collector* 4349.

VAR.  $\gamma$  *scandens*, C. B. Clarke. "A slender creeper, 20 to 25 ft. high." *Leaves* at the base nearly equal-sided, cuneate.

PERAK: *Goping*, alt. 300 to 500 ft., *King's Collector* 6058.

10. *JUSTICIA SUBALTERNANS*, C. B. Clarke, n. sp. A much-branched shrub, 2 to 4 ft. high, nearly glabrous. *Leaves* opposite, rarely subequal, one of each pair often wanting or less than ·125 in. long; nearly sessile, 1-sided, curved, shining, 4 by 1·25 in. long, acuminate, acute, minutely scabrous on the midrib beneath. *Inflorescence* of peduncled, axillary, short cymes. *Sepals* ·125 in. long, lanceolate, pube-

scent. *Stamens* 2; one anther-cell below the other, white-tailed. The flowers and inflorescence much as of *J. henicophylla*.

PERAK: Kinta, alt. 300 to 800 ft., *King's Collector* 7061.

11. *JUSTICIA ALTERNIFOLIA*, C. B. Clarke, n. sp. Shrub, 2 to 3 ft. high, with hairy stem. *Leaves* all alternate (*i. e.* one of each pair  $\cdot 1$  in. long, early deciduous); lamina ovate, oblique, acute, 7 by  $3\cdot 5$  in., very unequal at the base; primary nerves 8 to 9 pairs, hairy on the under side of the leaf; petioles  $\cdot 1$  to  $\cdot 25$  in. long. *Inflorescence* of small, short-peduncled, pubescent, axillary, few-flowered cymes; bracts and prophylla inconspicuous. *Capsule*  $\cdot 7$  in. long, hairy, cylindric at base, with 4 seeds at the top.

PERAK: alt. 500 to 700 ft., *King's Collector* 10680.

The corolla has not been seen. This can hardly be a species of *Hallieracantha*, as the cyme is too open and the calyx too small for that genus.

12. *JUSTICIA OTOPHORA*, C. B. Clarke, n. sp. Nearly glabrous. *Branches* slender, round, zigzag. *Leaves* sessile, one of each pair reduced to an ovate persistent ear  $\cdot 25$  to  $\cdot 35$  in. long; the other  $4\cdot 5$  by  $1\cdot 35$  in., elliptic; base unequal, rounded on one side; tip caudate-ligulate. *Peduncles*  $\cdot 5$  to 1 in. long, axillary, carrying small few-flowered cymes. *Sepals*  $\cdot 175$  in. long, linear-lanceolate, nearly glabrous. *Capsule*  $\cdot 7$  in. long, glabrate, cylindric at the base, with 4 seeds in the top.

PERAK: *Scortechini*.

The anther-tails have not been seen; it is inferred from the small calyx and the peduncled cymes that the genus is *Justicia* (alternate-leaved section), and not *Hallieracantha*.

13. *JUSTICIA GENDARUSSA*, Linn. f. Suppl. 85 (1781). Erect, 2 to 4 ft. high. *Leaves* 4 by  $\cdot 75$  in., lanceolate, glabrous, entire or undulate; petioles  $\cdot 25$  in. long. *Spikes* (condensed panicles) 2 to 5 by  $\cdot 75$  in., terminal, sometimes panicled; flowers clustered; floral leaves 0; bracts  $\cdot 125$  to  $\cdot 175$  in., linear. *Sepals* 5, linear, viscous-pubescent,  $\cdot 175$  in. long. *Corolla*  $\cdot 5$  in. long, white or rose-purple, pubescent without or nearly glabrous. *Stamens* 2; one anther-cell a little below the other, tailed; pollen  $30\ \mu$  long, ellipsoid, with 2 longitudinal rows of patches beside each stopple. *Capsule*  $\cdot 5$  in. long, clavate, glabrous, 4-seeded. Blume Bijdr. 785; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 532; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 347, t. 139, fig. D; Hemsl. in Journ. Linn. Soc. XXVI. 245 (1890); Ridley in Trans. Linn. Soc. ser. 2, Bot. III. 333 (1893), and in Journ. As. Soc. Straits, 122 (Singapore 1900); Prain Beng. Plants, 817, 818. *Gendarussa vulgaris*,

Nees in Wall. Pl. As. Rar. III. 104; Wight Ic. t. 468; Moritsi Verz. Zoll. Pl. 47; Hassk. Cat. Hort. Bogor. 151; Miq. Fl. Ind. Bat. II. 831.

PENANG: *King's Collector* 1461; *Deschamps*; *Curtis* 791. MALACCA: *Griffith*. PERAK: alt. 500 ft., *King's Collector* 8682. DINDINGS: Pangkore, *Scortechini* 208, 950.—DISTRIB. South-east Asia; largely cultivated.

The Malay Peninsula material may be all from cultivated plants; none shows a capsule. Ridley, l. c., observes that it seems never to fruit, and that he knows it only from gardens or remains of cultivation.

14. *JUSTICIA MAINGAYI*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 534 (1885). A small shrub, with weak branched stems 2 ft. long. Leaves 4 by .35 to 1.25 in., nearly glabrous, entire or undulate-crenate; tip acuminate; base cuneate; upper surface with raphides; petiole .2 in. Spikes terminal and axillary, 2 to 3 in. long, linear, peduncled, often 2 to 3 paniced on one peduncle; flowers mostly solitary, distant; bracts and prophylla minute. Sepals .175 in. long, lanceolate-linear, pubescent. Corolla .5 in. long, pubescent without, nearly as of *J. vasculosa*. Stamens 2; filaments glabrous; anther-cells 2, ellipsoid, one below the other with a white tail. Pollen oblong-ellipsoid. Capsule .35 in. long, 4-seeded at the top.

PENANG: *Maingay* (K.D.) 1181.

15. *JUSTICIA VASCULOSA*, Wall. Cat. 2469 (1826). Branches 8 to 20 in. long, dividing, rather weak. Leaves ovate to narrow-elliptic, attenuate at either end, up to 5 by 2 in., nearly glabrous; petiole .5 in. long. Spikes 2 to 4 in. long, linear or oblong, terminal and axillary, often clustered or subpaniculate; flowers distant, opposite, sessile, solitary or sometimes clustered; floral leaves often 0, sometimes several, narrow-lanceolate, .5 in. long, green, scattered about the lower portion of the spike; bracts and prophylla very small, pubescent. Sepals .175 in. long, linear-lanceolate, pubescent. Corolla .5 in. long, yellow; the mouth pink-spotted; upper lip oblong entire, lower pendent. Stamens 2; filaments glabrous; anther-cells 2, round-ellipsoid, one below the other, with a white knob at the base; pollen 40  $\mu$  long, ellipsoid, with 2 stopples and longitudinal rows of tubercles beside them. Pistil glabrous, except a few hairs near the base of the style. Capsule .6 in. long, with 4 seeds in the upper part, glabrate. T. Anders. in Journ. Linn. Soc. IX. 515 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 533. *Ruellia rivinaefolia*, Wall. Cat. 2413. *Gendarussa vasculosa*, Nees in Wall. Pl. As. Rar. III. 104. *Adhatoda vasculosa*, Nees in DC. Prodr. XI. 407.

PENANG: *Curtis*. PAHANG: *Ridley* 2183. SINGAPORE: *Ridley* 3165.—DISTRIB. Eastern India, plentiful, from Assam to Tenasserim; Sumatra.

16. *JUSTICIA UBER*, C. B. Clarke, n. sp. Stem 3 to 4 ft. high. Leaves opposite, subequal; blade up to 10 by 3 to 4 in., elliptic or sub-ovate, lanceolate acuminate at tip, cuneate at base; margin undulate; upper surface glabrate, lower paler, obscurely pubescent; raphides none or obscure; nerves 8 pairs, oblique; upper petioles .5 in. long. Spikes terminal and on axillary peduncles, sometimes paniced, dense, nearly always 1-sided, 1 to 3 by .5 in.; bract and prophylla .175 in. long, narrow-lanceolate, nearly glabrate. Sepals .175 in. long, narrow-lanceolate, nearly glabrous. Corolla greenish-yellow, .6 in. long, somewhat hairy without. Stamens 2; one anther-cell much below the other, with a white tail. Capsule .6 in. long, stalked, 4-seeded, glabrate. Seeds flattened, verrucose, tubercled.

PERAK: *Scortechini* 96, 319; alt. 400 to 700 ft., *Wray* 386; *King's Collector* 10245; *Ridley* 9773. SELANGOR: *Ridley* 8216.

This plant flowers and fruits freely; and there is more of it in the collections than of any other *Acanth* of the Malay Peninsula.

17. *JUSTICIA SUMATRANA*, C. B. Clarke. Nearly glabrous; the inflorescence minutely pubescent. Leaves opposite, subequal; blade 6 by 3 in., broadly elliptic, entire; tip very shortly acuminate; base cuneate; nerves 7 to 8 pairs; petiole .35 in. long. Peduncles near the ends of the branches, 4 to 6 in. long, each carrying a very lax panicle of thin linear spikes 2 to 4 in. long; floral leaves 0; flowers solitary, minutely pedicelled, opposite; bract and prophylla minute. Sepals .175 in. long, lanceolate linear, viscous-scabrous. Corolla greenish-white with purple spots, .4 in. long, minutely pubescent without. Stamens 2; filaments glabrous; anther-cells ellipsoid, one below the other, with a short conic white tail; pollen 25 by 15  $\mu$ , with longitudinal series of spots. Pistil glabrate, except the base of the style. Capsule .6 in. long, nearly glabrous, 4-seeded in the upper part; seeds cerebrose-tubercular. *Gendarussa* ? *sumatrana*, Miq. Fl. Ind. Bat. II. 832.

PERAK: *Scortechini* 340; *Wray* 1596.—DISTRIB. Sumatra (*Teijsmann*).

This species is allied to *J. flaccida*, Kurz, but the petioles are not eared at base; the flowers are much smaller.

18. *JUSTICIA PROCUMBENS*, Linn. Sp. Pl. 15 (1753). Annual, much branched, decumbent or procumbent. Branches slender, quadrangular. Leaves elliptic or oblong, 1 to 2 in. long, glabrous or hairy, short-

petioled. *Spikes* cylindric, continuous, hirsute; bracts linear-lanceolate, .175 in. long. *Sepals* 4, linear, .175 in. long, hirsute. *Corolla* .25 to .35 in. long, white pink-spotted. *Stamens* 2; anthers 2-celled; one cell below the other, tailed. *Capsule* .25 in. long, 4-seeded nearly from the base. Benth. Fl. Austral. IV. 549; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 532; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 246 (1890). *J. diffusa*, Prain Beng. Plants 818. *Rostellaria procumbens*, Nees in Wall. Pl. As. Rar. III. 101. *Rostellularia procumbens*, Nees in DC. Prodr. XI. 371; Moritsi Verz. Zoll. Pfl. 47; Miq. Fl. Ind. Bat. II. 826.

PENANG: *Curtis* 3099.—DISTRIB. South India; Australia.

The group to which *J. procumbens* belongs may be esteemed to form but one species; in which case its area would include all South and East Asia.

## 27. ADHATODA, Nees.

*Spikes* strobilate; the large bracts imbricated, green. *Stamens* 2; anther-cells 2, oblong, at nearly equal height, at the base subacute or with a minute knob, not tailed. Otherwise as *Justicia*.—DISTRIB. Species, the present common one; with which 6 or 8 other plants from Tropical Africa have been generically associated.

This plant resembles altogether the bracteate section of *Justicia* with strobilate spikes, except that the anther-cells have not at their base the characteristic white anther-tail.

1. ADHATODA VASICA, Nees in Wall. Pl. As. Rar. III. 103 (1832). A dense shrub, 3 to 8 ft. high. *Leaves* 8 by 3 in., elliptic, acute at either end, entire, minutely pubescent; petioles 1 in. long. *Peduncles* 1 to 6 in. long, from the upper axils of the branches. *Spikes* strobilate, 2 to 6 in. long; bracts ovate, green, entire, .75 by .25 in.; prophylla up to .5 by .125 in. *Sepals* .3 to .35 in. long, lanceolate. *Corolla* white, purple-spotted, 1.25 in. in total length; tube short, widened above the base. *Capsule* .75 in. long, stout, clavate, pubescent, with 4 rough seeds at the top. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 540 (*with syn.*); Prain Beng. Plants 819. *Justicia Adhatoda*, Linn. Sp. Pl. ed. i. 15, ed. ii. 20; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890); Ridley in Journ. As. Soc. Straits 122 (Singapore 1900). *Gendarussa Adhatoda*, Hassk. Cat. Hort. Bog. 151.

PENANG: *Curtis* 1017. SINGAPORE: *vide* Hook. f. Fl. Br. Ind. IV. 540.—DISTRIB. Throughout India, extending to Malaya; commonly cultivated.

## 28. RHINACANTHUS, Nees.

Erect or rambling herbs. *Leaves* entire; margins often undulate. *Flowers* in subsessile distant clusters on the branches of the panicle; bract and prophylla very small, linear. *Sepals* 5, linear, very small, hairy. *Corolla* 2-lipped; tube linear, longer than the lips; anticus lip patent, deeply 3-lobed; posticus lip narrowly oblong-linear, emarginate, curved and curled. *Stamens* 2; shortly exserted; anther-cells 2, one somewhat below the other, not tailed; pollen ellipsoid, longitudinally banded. *Ovary* hairy; ovules 2 in each cell; stigma shortly subequally 2-lobed. *Capsule* with cylindric stalk, and 4 seeds in the top; placenta not rising elastically. *Seeds* orbicular, flattened, black, pubescent.—**DISTRIB.** Species 3 or 4, in the warm parts of Africa and India.

1. RHINACANTHUS COMMUNIS, Nees in Wall. Pl. As. Rar. III. 109 (1832). Hairy or nearly glabrous, 2 to 4 ft. high. *Leaves* opposite, subequal, ovate to lanceolate, subobtuse, entire, 2 to 5 in. long, narrowed to a petiole 0 to .35 in. long. *Panicle* large, much-branched, with small clusters of flowers on peduncles, sometimes very leafy, sometimes with few small floral leaves; bracts .125 to .25 in. long. *Calyx* .125 to .25 in. long. *Corolla* white; tube .75 in. long, linear to the top. *Capsule* .7 in. long, hairy. Usually recognized by the curled linear-oblong lip of the corolla. Hassk. Cat. Hort. Bogor. 151; Moritsi Verz. Zoll. Pfl. 48; Miq. Fl. Ind. Bat. II. 833; C. B. Clarke in Dyer Fl. Trop. Afr. V. 224 (*with syn.*); Prain Beng. Plants 819. *R. Nasuta*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 339, t. 135, fig. E.

PENANG: *Deschamps*; *Curtis* 2918. TONGKAL: *Curtis* 2964. MALACCA: *Griffith*.—**DISTRIB.** Common in the warm parts of Africa and South-east Asia.

29. LEDA, C. B. Clarke [LEPTOSTACHYA, Nees, *partim*].

Herbs. *Panicle* loose; branches long, linear, with distant flowers solitary or in clusters in the typical form; bracts inconspicuous. *Stamens* 2; anther-cells 2, the lower without a tail, at equal height parallel, or one lower somewhat divaricate; pollen ellipsoid, with 2 stopples, the longitudinal rows of patches on either side of each stopple prominent or obsolete. Otherwise as *Justicia*, Sect. *Gendarussa*.—**DISTRIB.** Species 12, in South-east Asia.

The seventy American species, among which stands *Dianthera*, Linn., differ greatly in habit among themselves and from the Indian. The genus *Dianthera* is sunk in *Justicia* by Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 346, which then has three hundred species and is inconveniently large. But the Indian *Dianthera* only differs from *Justicia vasculosa*, Wallich, and its neighbours by the absence of a white tail to the lower anther-cell.



Panicle very open, with long linear branches :—

Leaves rounded or sometimes cordate at base..	..	1. <i>L. subcordata</i> .
Leaves obovate, attenuate at base..	..	2. <i>L. obovata</i> .
Panicle almost dense, oblong, hardly 1 in. broad	..	3. <i>L. densiflora</i> .
Panicle reduced to two or three flowers	..	4. <i>L. radicans</i> .
Terminal spikes simple; flowers solitary	..	5. <i>L. andrographioides</i> .

1. *LEDA SUBCORDATA*, C. B. Clarke, n. sp. Nearly glabrous; the innovations and inflorescence minutely pubescent. *Stem* 1 to 2 ft. long, divided, rambling, sometimes decumbent and rooting at the lower nodes (then with smaller leaves). *Leaves* opposite, subequal; blade 3·5 by 1·5 in., elliptic, acuminate, entire; base rounded or slightly cordate; petioles 1 in. long. *Panicles* terminal on the slender branches, and with few distant subsolitary flowers; bracts and prophylla minute. *Sepals* ·125 in. long, linear. *Corolla* white, ·5 in. long; tube straight, narrowly funnel-shaped. *Stamens* 2; anther-cells 2, parallel, at equal height, rounded at base; pollen 45 by 30  $\mu$ , with 2 stopples and 2 longitudinal bands on either side each stopple. *Style* glabrate.

PERAK: *King's Collector* 970; *Scortechini* 95; *Curtis* 3153.

This species is close to the Khasia *L. debilis*, C. B. Clarke sub *Dianthera*, in which the flowers are in approximate, sessile, opposite pairs, forming long linear spikes.

2. *LEDA OBOVATA*, C. B. Clarke, n. sp. Nearly glabrous; the inflorescence minutely pubescent. *Stem* 1 foot or more. *Leaves* opposite, subequal; blade 5·5 by 2·25 in. obovate, with a very short acumination, entire, with many raphides, long decurrent at base; petiole hardly ·5 in. long. *Panicle* terminal, long-peduncled, with few long linear branches; bracts and prophylla minute; the branches very narrow thinly flowered racemes; pedicels ·06 in. long, or occasionally 2 to 3 flowers clustered. *Sepals* ·125 in. long, linear, acute. *Corolla* ("yellow" in Ridley's example) ·5 in. long; tube straight, narrowly funnel-shaped. *Stamens* 2; anther-cells 2, parallel, one placed at one-third of its length below the other, rounded at base; pollen ellipsoid with longitudinal bands. *Capsule* (young) ·7 in. long, with a linear stalk, pubescent.

PERAK: *Scortechini* (type of species). SELANGOR: *Ridley* 7592 (an imperfect specimen; appears to match).

This species is near *Dianthera leptostachya*, Benth.

3. *LEDA* (?) *DENSIFLORA*, C. B. Clarke, n. sp. Glabrous. *Stems* 8 in. long, decumbent at base. *Leaves* opposite, equal, some 5 by 1 in., lanceolate, some 5 by 1·5 in, elliptic-lanceolate; nerves 7 to 8 pair, patent; raphides many, small on both surfaces; margin undulate; base cuneate to a petiole ·25 in. long. *Inflorescence* terminal; peduncle ·5 in. long;

panicle 2 by 1 in., many-flowered; pedicels 0 to .1 in. long; bracts and prophylla minute or 0. *Sepals* .06 in. long, lanceolate, glabrous. *Corolla* .5 in. long, yellow, straight, funnel-shaped, deeply 2-lipped. *Stamens* 2; filaments long, glabrous; anther-cells 2, oblong, parallel at equal height, obtuse at base, microscopically hairy; pollen ellipsoid, with 2 pores and 2 longitudinal lines of patches beside each stopple. *Capsule* .75 in. long, slender, glabrous, with 4 seeds in the upper half.

PERAK: *Ridley* 7165.

This plant satisfies the technical characters of *Leda*, but the habit and inflorescence are those of *Eranthemum*.

4. *LEDA RADICANS*, C. B. Clarke, n. sp. Creeping, rooting. *Stems* 10 in. long, divided, minutely pubescent. *Leaves* opposite, equal; blade ovate, 1.5 in. long, subentire, with many small raphides, rhomboid or nearly rounded at the base; petioles .25 to .5 in. long. *Inflorescence* terminal, depauperated, of 2 to 3 distant flowers. *Sepals* .125 to .175 in. long, linear, somewhat pubescent. *Corolla* nearly .5 in. long, as of *Dianthera*. *Stamens* 2; filaments glabrous; anther-cells 2, nearly at equal height, muticous; pollen short-ellipsoid, 25  $\mu$  long, with 2 stopples, obscurely marked longitudinally. *Pistil* glabrous.

PERAK: Ulu Salami, *Scortechini* 129.

The material for this plant is scanty, and the genus doubtful.

5. *LEDA ANDROGRAPHIOIDES*, C. B. Clarke. Nearly glabrous. *Stems* about 1 ft. high, weak. *Leaves* 3 in. long, elliptic, acuminate; petioles .25 to .5 in. long. *Spikes* 2 to 3 in. long, terminal, solitary; flowers solitary, opposite, in distant pairs; bracts inconspicuous. *Sepals* .125 in. long, linear-lanceolate, nearly glabrous. *Corolla* .5 in. long or rather more; tube cylindric, straight; lips short. One anther-cell below the other, with a minute callus at the base; hardly tailed. *Justicia andrographioides*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 534; *Ridley* in Journ. As. Soc. Straits 121 (Singapore 1900).

SINGAPORE; fide *Ridley*.—DISTRIB. Tenasserim.

### 30. *POLYTREMA*, C. B. Clarke, n. gen.

Slender undershrubs. Opposite pairs of *leaves* equal or unequal. *Inflorescence* in small, few-flowered, axillary cymes; bracts inconspicuous. *Calyx*-lobes 5, linear. *Corolla* small, 2-lipped. *Stamens* 2; anther-cells 2, oblong, standing a little apart, one slightly below the other, having its base muticous or sometimes acute, not tailed. *Pollen* globose or obscurely trigonous-globose, without (or with very obscure) longitudinal bands, surface smooth or most minutely uniformly granu-

lar; stopples 4 in the typical species, possibly 4 to 3 in other species. *Capsule* stalked, with 4 seeds.—**DISTRIB.** Species: the 3 here described and 1 in the Philippines.

A group of species resembling in habit some of the Malay plants referred to *Ptysiglottis* by Hallier f. in Nova Acta Leop. Carol. Akad. 70 (1897) (as *P. lanceolata*, Hallier f. l.c. 221, t. 15, fig. 1, or *P. frutescens*, Hallier f. l.c. 222, t. 16, fig. 2), which have ellipsoid pollen longitudinally banded and anther-cells approximated. The type *Ptysiglottis* from Ceylon is remote in habit and has approximated anther-cells.

Leaves of opposite pairs (many of them) very unequal:—

Leaves entire; sepals .35 in. long .. ..	1. <i>P. vulgare</i> .
Leaves finely crenulate; sepals .2 in. long .. ..	2. <i>P. crenulatum</i> .
Leaves of opposite pairs equal or very nearly so .. ..	3. <i>P. isophyllum</i> .

1. **POLYTREMA VULGARE**, C. B. Clarke, n. sp. Nearly glabrous; branches round, somewhat zigzag. *Leaves* opposite, one reduced to an ovate auricle .25 to .5 in. long, the other elliptic or broadly elliptic, 4 to 6 in. long, entire, covered with small raphides; tip acuminate; base rhomboid not rounded; primary nerves 10 to 11 pair; petiole 0 to .175 in. long. *Cymes* few-flowered, small, sessile or very nearly so in the axils; bracts and prophylla hardly any. *Sepals* .35 in. long, setaceous, minutely pubescent or nearly glabrous. *Corolla* .7 in. long; tube inflated in the upper half. *Stamens* 2; anther-cells 2, mucicous, distant, one rather the lower. *Style* glabrous. *Capsule* .7 in. long, glabrate, with 4 seeds in the upper part.

PERAK: Ridley 7164, 9445, 9768; Wray 3591 (partly); Goping, King's Collector 486. SELANGOR: Ridley 8545.

2. **POLYTREMA CRENULATUM**, C. B. Clarke, n. sp. *Branches* 6 to 8 in. long, decumbent, much divided. *Leaves* up to 2.5 by 1 in., subsessile, elliptic-acuminate; margin finely crenulate. *Cymes* closely axillary, 1- to 3-flowered. *Sepals* .2 in. long, linear-setaceous, nearly glabrous. *Corolla* .35 in. long. Otherwise as *P. vulgare*.

PERAK: *Scortechini* (two collections without number).

This is possibly only a starved form of *P. vulgare*, but it is considerably smaller in every part.

3. **POLYTREMA ISOPHYLLUM**, C. B. Clarke, n. sp. Herb, 1 to 2 ft. high, nearly glabrous. *Leaves* opposite, equal, yellow when dry; blade 4.5 by 1.75 in., elliptic-acuminate; base cuneate, entire, covered with raphides; primary nerves 7 to 8 pair; petioles .5 to 1 in. long. *Cymes* small, few-flowered, closely axillary. *Sepals* .35 in. long, setaceous, minutely pubescent. *Corolla* white, more than .5 in. long. *Stamens* 2; filaments glabrous; anther-cells rather long, not tailed,

distant but nearly parallel, one (for one-third its length) below the other. *Pistil* glabrous.

PERAK : *Scortechini* 224.

### 31. ECBOLIUM, Kurz.

*Spikes* strobilate; bracts imbricate, enclosing the calyx. *Corolla*-tube linear. *Stamens* 2, without rudiments; anther-cells 2, narrowly oblong, at equal height, muticous; pollen globose, with meridional bands. *Capsule* stalked, with 4 large flat seeds in the round head. Otherwise as *Justicia*.—DISTRIB. Species 12 in the warm parts of Africa, Madagascar, Arabia, and India.

This genus resembles the section *Bracteata* of *Justicia*, which has similar strobilate spikes; it differs in having the anther-cells at equal height and without tails. It is difficult to say by what character it differs from some of the American species of *Dianthera*; but the Malay *Diantheræ* (*Leda*) have all very small bracts.

1. ECBOLIUM LINNEANUM, Kurz in Journ. As. Soc. Beng. XL. ii. 75 (1871). A small shrub, glabrate; the inflorescence somewhat pubescent. *Leaves* opposite, equal, elliptic or obovate, acute, 3 to 6 in. long; base cuneate; petiole .5 to 1.5 in. *Spikes* strobilate, 2 to 6 in. long, terminal and on axillary peduncles; bracts ovate, .5 in. long, green, varying in their margin, which is sometimes serrate, sometimes quite entire, rounded at the tip; prophylla 2, minute. *Sepals* .2 in. long, narrow. *Corolla* green-blue; tube .75 to 1 in. long, linear to the top; lips .35 to .5 in. long. *Capsule* .75 in. long; stalk narrowly cylindric; head round, flat, .3 in. in diam., containing 2 large, round, thin, rough seeds. Boiss. Fl. Orient. IV. 526; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 338; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 544, and in Dyer Fl. Trop. Afr. V. 236 (*with syn.*); Prain Beng. Plants 816.

PENANG : *King's Collector* 1671. MALACCA : *Maingay* (K.D.) 1172. SINGAPORE : *Deschamps*. — DISTRIB. Common in warm Africa and India; not yet known from the Malay Archipelago.

Recognized by its green-blue corolla, or by the broad head to the capsule.

### 32. GRAPTOPHYLLUM, Nees.

Glabrous shrubs. *Leaves* equal, opposite, entire. *Panicles* terminal, dense, oblong; bracts and prophylla very small. *Corolla* large, red; tube narrowly funnel-shaped, curved; otherwise nearly as *Ecbolium*.—DISTRIB. Species 3, whereof 1 is widely spread in the warm regions of the Old World, and 2 in Australia.

The red corolla has a much broader tube than that of *Ecbolium*. The much-cultivated species here described is not confounded with *Ecbolium*, but is marked

sometimes *Justicia*, from which it differs by the anther-cells at equal height, not tailed.

1. *GRAPTOPHYLLUM HORTENSE*, Nees in Wall. Pl. As. Rar. III. 102 (1832). Attains 6 to 8 ft. in height. *Leaves* broadly elliptic, 5 to 9 in. long, cuneate at either end; petiole hardly .25 in. *Panicle* narrowed nearly to a raceme, terminal, subsessile, 10- to 40-flowered; bracts and prophylla inconspicuous. *Sepals* .175 in. long. *Corolla* red; tube .75 in. long; lips .5 in. long. Hassk. Cat. Hort. Bogor. 150; Moritzi Verz. Zoll. Pfl. 47; Miq. Fl. Ind. Bat. II. 824; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 545, and in Dyer Fl. Trop. Afr. V. 241 (*with syn.*). *G. pictum*, Griff. Notul. IV. 139; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 327.

PERAK: *Scortechini* 1545. KEDAH: *King's Collector* 1765. Wild probably in the Malay Archipelago, where it is plentiful. Frequent in India, also in Guinea, where it is almost certainly introduced.

### 33. PERISTROPHE, Nees.

Erect branched herbs. *Leaves* opposite, subequal, petioled. *Flowers* 1 to 4 together, and of these one or more often imperfect, clustered between 2 floral leaves; the flower-clusters often peduncled, axillary or terminal; bract and prophylla to each flower small or 0. *Calyx* small, deeply lobed into 5 subequal lanceolate teeth. *Corolla* rose or purple; tube slender; limb 2-lipped; upper lip subentire, lower subequally 3-lobed. *Stamens* 2; filaments pubescent below; anther-cells 2, muticous, narrow, curved, one half its length above the other; pollen short-ellipsoid, longitudinally banded. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* ellipsoid, stalked, minutely pubescent; placenta not rising elastically from the base; seeds granular, subtubercular.—**DISTRIB.** Species 25, but several very close together, extending from Africa to Japan and New Caledonia.

Floral leaves ovate triangular, .5 in. broad; corolla 1.25 in. long 1. *P. tinctoria*.

Floral leaves broadly lanceolate, .175 in. broad; corolla .75 in. long 3. *P. salicifolia*.

Floral leaves linear-ligulate, .06 to .09 in. broad; corolla .75 to

1 in. long .. .. 2. *P. acuminata*.

These three species are very closely allied, as are all species admitted of this group by Nees and Miquel. *P. montana*, Nees, *P. angustifolia*, Nees, *P. salicifolia*, Blume, *P. commutata*, Nees, are not improbably natives of the Malay Peninsula, but are included between *P. tinctoria* and *P. acuminata*.

1. *PERISTROPHE TINCTORIA*, Nees in Wall. Pl. As. Rar. III. 113 (1832). Often 3 to 4 ft. high. *Leaves* 3.5 by 1.75 in., cuneate at either end, entire, sparingly pubescent; petioles .25 to 1 in. long. *Peduncles*

·25 to 1 in. long, several often approximated, subpanicled, often glabrate. *Floral leaves* ovate-triangular, large, up to 1 by ·5 in.; margins not ciliate, but (more or less) minutely scabrid. *Calyx* ·175 to ·2 in. long, grey, hairy; teeth lanceolate. *Corolla* 1·25 in. long. *Anthers* ·175 in. long. *Capsule* ·6 in. long. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 556; Hemsl. in Journ. Linn. Soc. XXVI. 248 (1890); Prain Beng. Plants 820. *P. pallida*, Nees in DC. Prodr. XI. 494; Miq. Fl. Ind. Bat. II. 846; Ridley in Trans. Linn. Soc. ser. 2, III. 334 (1893).

JOHORE: *Ridley*. KRIAN: *Scortechini* 1373. SINGAPORE: *Scortechini* 370, 816.—DISTRIB. Cultivated much in South-east Asia.

*P. fera*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 556, is possibly the wild form of *P. tinctoria*, and hardly differs from it but by having the floral leaves ciliate on the margins. This plant is (partly) described as *P. tinctoria* by Nees and Miquel; I have seen no example of it from the Malay Peninsula.

2. PERISTROPHE ACUMINATA, Nees in Wall. Pl. As. Rar. III. 113 (1832). Smaller than *P. tinctoria*, Nees, in all its parts. *Floral leaves* ·5 by ·06 to ·09 in. broad, glabrous. *Corolla* ·75 to 1 in. long. *Capsule* ·5 in. long. Nees in DC. Prodr. XI. 496; T. Anders. in Journ. Linn. Soc. IX. 521 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 555; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 331; Ridley in Trans. Linn. Soc. ser. 2, III. 334 (1893), and in Journ. As. Soc. Straits 122 (Singapore 1900). *P. Blumeana*, Hassk. Cat. Hort. Bogor. 152; Nees in DC. Prodr. XI. 495; Miq. Fl. Ind. Bat. II. 848. *Justicia Roxburghiana*, Blume Bijdr. 786, *fide* Miquel.

PENANG: *Deschamps*, *Curtis* 681. PAHANG: *Ridley* 1165. PERAK: *Scortechini* 14, 146; *King's Collector* 285. MALACCA: *Griffith*; *Harvey*; *Curtis* 254; *Goodenough*. SINGAPORE: *Hullett* 93. PEKAN: *fide* *Ridley*.—DISTRIB. Eastern India, Burma, Java.

3. PERISTROPHE SALICIFOLIA, Miq. Fl. Ind. Bat. II. 847 (1856). *Leaves* oblong-lanceolate, often 3 by ·5 in., rarely elliptic-lanceolate, often long acuminate. *Floral leaves* ·6 by ·175 in. (or broader). *Corolla* ·75 in. long. *Capsule* ·5 in. long. *Justicia salicifolia*, Blume Bijdr. 787. *Hypoestes salicifolia*, O. Kuntze Revisio I. 491 (1891).

PENANG: *Deschamps*; *King's Collector*; *Ridley* 9375. PERAK: *Scortechini*; *Wray* 847.—DISTRIB. Java.

This species is separated here from *P. acuminata* by the sole character of broader bracts, and I doubt its specific distinctness. It is a curious coincidence that O. Kuntze should have named his plant (which is at Kew) *salicifolia*, as he did not intend it to be = Blume's *Justicia salicifolia*.

## 34. HYPOESTES, R. BROWN.

Erect branched herbs or shrubs. *Leaves* opposite, subequal, petioled. *Flowers* paired, one of these often imperfect or wanting the two bracts connate (in the Malay species) into an obconic or cylindric involucre; prophylla to the lower bract inside the involucre usually longer than the calyx; prophylla to the upper bract often 0; involucre often numerous, in heads, dense panicles or racemes. *Calyx* shorter than the involucre, deeply lobed; teeth 5, lanceolate. *Corolla* rose-purple; tube linear; lips 2, narrow. *Stamens* 2; anthers of 1 cell, muticous; pollen ellipsoid, longitudinally striate. *Ovary* 4-ovulate; style glabrate upwards, shortly bifid. *Capsule* oblong or ellipsoid, stalked, 4-seeded; placenta not rising elastically from the base of the capsule; seeds glabrous, tuberculate-granular.—*DISTRIB.* Species 40, mostly in Africa and Mascarenia; 8 species are described by Miquel from Malaya, but these 8 are so closely allied that they might be described as 2.

The genus *Hypoestes* abounds in the Malay Archipelago, and the quantity of material from thence is very large. In India, again, *Hypoestes* is frequent. But from the Malay Peninsula I have only seen one collection, viz. Maingay 1176, here described.

1. *HYPOESTES MALACCENSIS*, Wight Ic. 1555 (before 1850). Pubescent, branched, 1 to 2 ft. high. *Leaves* up to 3 by .8 in., elliptic-lanceolate, narrowed at either end, entire, petiole .5 in. long. *Involucres* in axillary and terminal ovoid clusters 1 in. long; involucre .8 in. long, shortly conic at base, with 2 linear teeth. *Calyx* .25 in. long, minutely thinly hairy. *Corolla* .75 in. long. *Pollen* with 3 stopples. T. Anders. in Journ. Linn. Soc. IX. 522 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 558; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 333. *H. rosea*, Dene. in Nouv. Ann. Mus. III. 381 (Paris 1834) (*non* Beauv.).

*MALACCA*: Griffith; Capt. A. C. Wight; Maingay (K.D.) 1176.—*DISTRIB.* Malay Islands.

With this is united (in Fl. Br. Ind. IV. 558) the Malay Archipelago species *H. Decaisneana*, Nees, and *H. laxiflora*, Nees, which differ very little.

## 35. RUNGIA, NEES.

Small undershrubs or herbs. *Leaves* opposite, equal. *Flowers* in peduncled spikes; floral leaves sometimes strobilate, including two bracts; lower bract longer than the calyx, upper smaller, sterile, nearly always empty. *Sepals* 5, nearly separate, linear. *Corolla* small, 2-lipped; tube oblong, short; lobes imbricated in the bud. *Stamens* 2;

1 anther-cell below the other usually appendaged; pollen ellipsoid, longitudinally banded. *Ovary* 4-ovulate; style at tip emarginate. *Capsule* small, with 4 or 2 seeds; placentæ rising elastically with the seeds, from the base of the capsule; seeds glabrous, minutely tuberculate.—**DISTRIB.** Species 35, mainly in India, extending to China, Australia, and Africa.

This genus can be separated from the small species of *Justicia* by the fruit.

1. *RUNGIA LAXIFLORA*, C. B. Clarke. Suberect, 3 ft. high, nearly glabrous. *Leaves*: lamina 3·5 by 1·25 in., elliptic, narrowed at either end; petioles ·25 to 1 in. long. *Spikes* 2 to 4 in. long, linear, flexuose, very lax; the outer bracts often scarcely imbricated. *Bract* (floral leaf) 9 mm. long, narrow-lanceolate, with scarious margins; the two prophylla lanceolate with scarious margins, the lower ·3 in. long, the upper sterile, smaller. *Sepals* ·275 in. long, linear, glabrous. *Corolla* ·6 in. long, "pale yellow, striped with light grey" (Collector's note). *Stamens* 2; lower anther-cell smaller than the upper, with a white spur; pollen 50  $\mu$  long, with 3 stopples. *Style* glabrous, minutely hairy near the base. *Capsule* ·35 in. long; minutely hairy; placentæ rising elastically; seeds minutely tubercled. ? *Justicia laxiflora*, Blume Bijdr. 789.

PERAK: *Scortechini*; Larút, alt. 3000 ft., *King's Collector* 3676; alt. 100 ft., *King's Collector* 1815.—**DISTRIB.** Java (?).

*Justicia laxiflora*, Blume, has the filament "antice barbata," and could hardly be this. It was Zollinger, n. 1539 *vide* Moritzi Verz. Zoll. Pfl. 47, which I have not got. But I believe I got the name *Rungia laxiflora* from a Java plant marked *Justicia laxiflora*, which passed through my hands.

2. *RUNGIA MINUTIFLORA*, C. B. Clarke, n. sp. Suberect, a branched herb, 9 in. high. *Leaves*: blade 2 by ·75 in., ovate-lanceolate; tip obtuse, nearly glabrous, attenuated at base; petiole up to ·5 in. long. *Spikes* linear, 1 to 1·25 in. long, very lax, interrupted at base; flower-bract ·125 in. long, elliptic-obtuse, green, microscopically brown-hairy. *Corolla* ·2 in. long. *Stamens* 2; one anther-cell a little below the other distinctly tailed. *Capsule* ·15 to ·175 in. long; placentæ rising elastically from the valves; seeds brown, minutely tuberculated.

KEDAH: Lankawi Island, *Curtis* 3689.



Family XCI.—LABIATÆ.

[By D. PRAIN.]

Herbs, less often shrubs, usually beset with oil-glands. *Stem* usually 4-angled. *Leaves* opposite or whorled; exstipellate. *Flowers* irregular, solitary, 2-nate or fascicled, axillary or in centrifugal spicate cymes which by union in pairs form false whorls. *Calyx* persistent, nearly regular, or variously 4- to 5-cleft, or 2-lipped. *Corolla* gamopetalous, hypogynous; limb 4- to 5-lobed, or 2-lipped and personate, the lobes imbricate in bud. *Stamens* attached to the corolla-tube, usually 4 didynamous, sometimes the upper pair imperfect; anther-cells divaricate or parallel, sometimes disjoined, sometimes confluent. *Disk* usually prominent, regular or irregular. *Ovary* free, composed of two 2-celled carpels, the cells of which are also free; style simple, inserted between the lobes of the ovary; the stigma usually 2-lobed, its arms often unequal; ovules in each cell solitary, erect, anatropous. *Fruit* of 4 dry or rarely fleshy 1-seeded nutlets, rarely one or more of these abortive, situated at the base of the calyx; scar of attachment usually basal, small, occasionally lateral or sublateral and larger. *Seeds* small, erect, without albumen, or albumen very scanty; radicle inferior.—DISTRIB. Species about 2800, mainly in North Temperate regions.

Stamens 4, declinate :—

Lowest corolla-lobe patent, flat or slightly concave, wide-based; calyx-limb 2-lipped; upper tooth much wider than the others; filaments free :—

Corolla-tube very short, not or slightly exserted; stigma

2-fid .. .. . 1. OCIMUM.

Corolla-tube long, usually far exserted; stigma entire or

subentire .. .. . 2. ORTHOSIPHON.

Lowest corolla-lobe deflexed, saccate or cymbiform, narrow-based :—

Calyx-limb uniform; teeth 5, subequal; lowest corolla-lobe thick-edged, deeply saccate, not much longer than the others; filaments free .. .. .

3. HYPTIS.

Calyx-limb 2-lipped; upper tooth often (not always) wider than the others; lowest corolla-lobe cymbiform, much longer than the others, its margin not thickened :—

Filaments free beyond point of insertion on corolla-tube

4. PLECTRANTHUS.

Filaments connate in a sheath round the style ..

5. COLEUS.

Stamens not declinate; filaments free :—

Stamens 4, erect or spreading, equal or subequal; calyx-limb uniform; teeth 5, subequal; corolla-lobes 4, flat, subequal :—

- Anthers 1-celled; filaments bearded:—  
   Whorls glomerulate in stout, lax, usually interrupted spikes .. .. . 6. *POGOSTEMON*.  
   Whorls aggregated in slender, dense, continuous spikes .. .. . 7. *DYSOPHYLLA*.  
 Anthers 2-celled, cells parallel; filaments not bearded; whorls sometimes terminal, usually axillary .. .. . 8. *MENTHA*.  
 Stamens ascending under upper lip of corolla; usually 4 didynamous, the anterior pair the longer; sometimes 2, one pair being imperfect; corolla 2-lipped:—  
   Calyx-limb distinctly 2-lipped:—  
     Calyx-throat remaining open after flowering; tube without dorsal appendage, undivided in fruit and persistent:—  
       Stamens two pairs; upper calyx-lip 3-toothed .. .. . 9. *CALAMINTHA*.  
       Stamens one pair, with remote anther-cells; upper calyx-lip 3-toothed or entire .. .. . 10. *SALVIA*.  
     Calyx-throat occluded after flowering; tube with a dorsal plate or pouch, 2-partite; the upper segment deciduous in fruit .. .. . 11. *SCUTELLARIA*.  
   Calyx-limb uniform, or, if oblique, not 2-lipped; the teeth subequal:—  
     Anthers dimorphic; cells of anterior longer pair dimidiate, 1-locular, of posterior shorter pair 2-locular; upper corolla-lip short, flattish, pubescent externally but not woolly; flowers medium, purplish; calyx-teeth 5, subequal .. .. . 12. *ANISOMELES*.  
     Anthers uniform; upper corolla-lip arched or hooded over stamens:—  
       Calyx-teeth 6 to 10; limb often oblique; upper corolla-lip densely woolly externally:—  
         Lower corolla-lip shorter than upper; flowers large, yellow .. .. . 13. *LEONOTIS*.  
         Lower corolla-lip longer than upper; flowers medium or small, white .. .. . 14. *LEUCAS*.  
       Calyx-teeth 5, subequal; limb uniform; upper corolla-lip pubescent externally but not woolly:—  
         Nutlets with a small basal or subbasal scar:—  
           Nutlets dry; flowers medium:—  
             Calyx-teeth spinescent; flowers purplish; leaves deeply incised .. .. . 15. *LEONURUS*.  
             Calyx-teeth herbaceous; flowers white or yellow; leaves not incised .. .. . 16. *PARAPHLOMIS*.  
           Nutlets fleshy; flowers large, yellow or white .. .. . 17. *GOMPHOSTEMMA*.  
         Nutlets with a large lateral scar; flowers very small, yellow .. .. . 18. *CYMARIA*.

# 1. *OCIMUM*, Linn.

Strongly scented herbs or undershrubs. *Flowers* small, in 6- to 10-flowered whorls, spicate or racemose; pedicels recurved under the calyx; bracts small, caducous. *Calyx* ovoid or campanulate, in fruit

deflexed, 2-lipped; upper lip broad, flat, decurrent; lower usually with 4 slender teeth, the central pair exceeding the lateral. *Corolla-tube* short, not annulate within; limb 2-lipped; lower lip declinate, entire, flat or nearly so; upper rather shorter than lower, subequally 4-fid. *Stamens* 4, declinate, didynamous, exserted; filaments free or the lower pair connate below, naked or the upper toothed or hairy below; anther-cells confluent. *Disk* entire or 3- to 4-lobed. *Style* 2-fid; lobes subulate or flattened. *Nutlets* smooth or subrugose, mucilaginous when moistened. —DISTRIB. Species about 60, throughout the Tropics.

Pedicels equalling or exceeding the calyx; two lower calyx-teeth

longer than the upper lip .. .. 1. *O. sanctum*.

Pedicels much shorter than the calyx:—

Lower calyx-teeth longer than the upper lip .. .. 2. *O. Basilicum*.

Lower calyx-teeth shorter than the upper lip .. .. 3. *O. gratissimum*.

1. *OCIMUM SANCTUM*, Linn. Mant. 85 (1767). An erect, softly hairy, much-branched herb, 1 to 2 ft. high. *Stems* and branches usually purplish, often woody at the base. *Leaves* opposite, membranous, pubescent on both surfaces, especially on the nerves and principally beneath, elliptic-oblong, obtuse or acute; base cuneate or truncate, entire; the margin elsewhere entire or serrate; 1 to 2 in. long, .6 to 1.2 in. wide; petiole .5 to 1 in. long, slender, pubescent. *Flowers* in slender racemes or panicles, 6 to 8 in. long, of rather close whorls; bracts ovate-acuminate, .12 in. long, ciliate. *Calyx* .12 in. (in fruit .2 in.) long; pedicels longer than the calyx, slender, .25 in. long, pubescent; lower lip of calyx longer than upper, its 4 teeth lanceolate, similar below; the central pair with long, slender, awn-like, upcurved tips, which project beyond the upper lip; the lateral pair with short straight tips; upper lip wide-obovate or suborbicular, reflexed, shortly apiculate. *Corolla* .15 in. long, purplish-pink; upper lip pubescent on the back. *Filaments* exserted, slender; the upper ones with a small bearded basal appendage. *Nutlets* .05 in. long, wide-ellipsoid, smooth, yellow with black markings. Roxb. Fl. Ind. III. 14; Wall. Cat. 2716; Benth. in DC. Prodr. XII. 38; Miq. Fl. Ind. Bat. II. 939; Hook. f. Fl. Br. Ind. IV. 609; Prain Beng. Plants 843. *O. monachorum*, Linn. Mant. 85. *O. tenuiflorum*, Linn. Sp. Pl. I. 597; Benth. in DC. Prodr. XII. 39. *O. inodorum*, Burm. Thes. Zeylan. 175, t. 80, f. 2.

In most of the provinces; in waste places. — DISTRIB. South-east Asia from Arabia eastwards; Australia; Pacific Islands.

This, the Sacred Tulsi of India, is no doubt an introduced plant in our area; where it is indigenous is uncertain.

2. *OCIMUM BASILICUM*, Linn. Sp. Pl. 597 (1753). An erect branching herb, 2 to 3 ft. high. *Stems* and branches usually green, sometimes purplish, glabrous or more or less hispidly hairy. *Leaves* opposite, membranous, green or purplish, variously pubescent, in extreme forms quite glabrous, in others strongly hispidly hairy, ovate-acute; base cuneate, entire; margin elsewhere entire or toothed or occasionally (in cultivated forms) deeply lobed; 1 to 2 in. long, .6 to 1.2 in. wide, occasionally, in cultivated varieties, larger; petiole .5 to 1 in. long. *Flowers* in rather dense racemes of whorls, the terminal raceme ultimately 6 to 8 in. long, much exceeding the lateral, rarely (var. *thyrsoides*) with all the racemes subequal, forming a terminal thyrse; bracts ovate-acute, petiolate. *Calyx* .2 in. (in fruit .35 in.) long; pedicels very short; lower lip with central pair of teeth longer than the upper lip, which is orbicular, longer than the campanulate tube. *Corolla* .35 to .5 in. long, variously white or pink or purplish, nearly or quite glabrous to pubescent or (var. *ciliata*) hispidulous. *Filaments* shortly exerted; the upper ones with a tooth above the base. *Nutlets* .07 in. long, ellipsoid, pitted. Wall. Cat. 2713; Hook. f. Fl. Br. Ind. IV. 608.

PERAK: *Wray*! PENANG: *Wallich*! MALACCA. Perhaps only cultivated in our area.—DISTRIB. Throughout Tropics of Eastern Hemisphere and Polynesia.

The presence of this species in Malacca is recorded by Sir J. D. Hooker (Fl. Br. Ind. l. c.), but there are not now any Malacca specimens at Kew. In Penang it has only been collected by Wallich; his plant is a glabrous form never met with in India save in gardens. No complete specimens have been sent from Perak, but Wray records the species, under the name "Ruku," as an adulterant of Patchouli. "Ruku" is, however, the Malay name for *Hyptis graveolens*, which is one of the usual adulterants of Patchouli leaves, though the writer finds that samples of "Ruku" do contain, mixed with the leaves and calyces of *Hyptis graveolens*, calyces of *O. Basilicum*. The particular variety met with in these samples being var. *pilosum*, there is just a possibility that in Perak this may sometimes occur as an escape from cultivation.

3. *OCIMUM GRATISSIMUM*, Linn. Sp. Pl. 1197 (1753). A shrubby, much-branched perennial, 4 to 6 ft. high, woody at the base. *Stems* glabrous; young branches pubescent. *Leaves* opposite, chartaceous, pubescent, elliptic-lanceolate, acute; base cuneate, entire; margin elsewhere coarsely crenate-serrate; 2.5 to 5 in. long, 1.5 to 2.25 in. wide; petiole 1 to 2.5 in. long, slender, pubescent. *Flowers* in simple or branched, strict, slender racemes; whorls rather close; rachis softly pubescent; bracts sessile, acuminate from a wide ovate base, exceeding the calyx, decussate and squarrose in young racemes. *Calyx* .12 in. (in fruit .25 in.) long, pubescent, glandular; pedicels very short, softly

pubescent; lower lip with central pair of teeth minute and much shorter than the upper lip, which is rounded and recurved. *Corolla* .17 in. long, yellowish- or greenish-white, externally pubescent. *Filaments* distinctly exserted; upper pair with a bearded tooth at the base. *Nutlets* .06 in. long, subglobose, rugose, brown. Roxb. Fl. Ind. III. 17; Wall. Cat. 2720; Hook. f. Fl. Br. Ind. IV. 608.

PENANG: *Wallich*. Almost certainly only cultivated in our area.—  
DISTRIB. Tropics generally, but doubtfully indigenous in America.

The only record of this species from our area is that of Wallich, who collected specimens in Penang in 1822. Seeing that no one has sent it since from any of the provinces, it may almost certainly be concluded that Wallich's specimens came from cultivated plants or from casual escapes that have not become permanently established.

## 2. ORTHOSIPHON, Benth.

Herbs, undershrubs, or shrubs. *Flowers* in 6- or fewer-flowered racemously arranged whorls; bracts small. *Calyx* 2-lipped, ovoid or campanulate-tubular, deflexed in fruit; lower lip 4-toothed, the central and lateral teeth distinct or shortly connate, usually subulate; upper lip broad, membranous; the margins decurrent. *Corolla* 2-lipped; tube often slender, straight or incurved; lower lip entire, concave; upper lip 3- to 4-fid. *Stamens* 4, declinate, didynamous, included or exserted; filaments free, not appendaged at base; anther-cells confluent. *Disk* usually gibbous. *Style* with a small capitate or clavate, entire or notched stigma. *Nutlets* dry, ovoid or globose, smooth or nearly so.—DISTRIB. Species about 60, in Tropics of the Old World.

ORTHOSIPHON STAMINEUS, Benth. in Wall. Pl. As. Rar. II. 15 (1831). A slender glabrous or pubescent herb, 1 to 2 ft. high; stems distinctly quadrangular. *Leaves* opposite, membranous, usually puberulous to pubescent on the nerves on both surfaces, otherwise glabrous, rather dark-green above, ovate-acuminate, with long entire cuneate base; margin elsewhere coarsely wide-serrate; 2 to 4 in. long, .75 to 1.5 in. wide; petiole .25 to .4 in. long, puberulous or pubescent. *Flowers* in rather distant whorls, .6 in. apart below, these arranged in lax terminal racemes 4 to 8 in. long, 1.5 in. across, not including the far-exserted filaments. *Calyx* .15 in. (in fruit .25 in.) long, campanulate, puberulous on the nerves, gland-dotted between; the two central teeth of lower lip subulate. *Corolla* uniformly finely puberulous, 1 in. long, purplish or white; tube slender, straight, thrice as long as calyx; lower lip straight, .2 in. long; upper lip refracted, .2 in. long. *Filaments* glabrous, capillary, projecting 1.2 in. beyond corolla-limb. *Nutlets* wide-oblong, compressed, rugulose. Benth. Lab. Gen. & Sp. 29, and in DC. Prodr. XII.

52; Wall. Cat. 2727; Bot. Mag. t. 5833; Miq. Fl. Ind. Bat. II. 944; Hook. f. Fl. Br. Ind. IV. 615. *Ocimum grandiflorum*, Blume Bijdr. 835. *O. longiflorum*, Ham. in Wall. Cat. l. c.

PERAK: *Kunstler*! SINGAPORE: *Deschamps*! NICOBARS: *Kurz*!—  
DISTRIB. South-eastern Asia and Australia.

### 3. HYPTIS, Jacq.

Herbs or shrubs. *Flowers* small or medium, very variously arranged; in our species arranged in dense capitate or lax secund heads; bracts subulate or setaceous. *Calyx* 10-nerved, ovate or campanulate or tubular; teeth 5; subequal, erect. *Corolla* 5-lobed; lowest lobe abruptly deflexed, with thickened margin, saccate and contracted at the base; the other lobes erect or spreading, flat. *Stamens* 4, declinate; filaments free, without basal appendages; anther-cells confluent. *Disk* entire, regular or somewhat gibbous in front. *Style* with subentire or 2-fid stigma. *Nutlets* oblong or ovoid, smooth or rugulose.—DISTRIB. Species about 250, all American; a few introduced and established in the Tropics of the Old World.

Flowers in dense, globose, axillary, many-flowered heads

.. 1. *H. brevipes*.

Flowers in lax, secund, racemose, few-flowered heads

.. 2. *H. suaveolens*.

1. HYPTIS BREVIPES, Poit. Ann. Mus. Par. VII. 465 (1806). An erect annual herb, 2 to 3 ft. high. *Stems* glabrate or pilose. *Leaves* opposite, membranous, medium-green and sparsely hispid throughout above, paler and pubescent on the nerves beneath, ovate-oblong or lanceolate; apex acute; base long-cuneate, entire; margin elsewhere serrate; 2 to 3 in. long, .75 to 1 in. wide; petiole .25 to .5 in. long. *Flowers* in dense heads, .4 in. in diam., on axillary, hispid, slender peduncles .4 to .5 in. long; bracts ciliate, lanceolate or subulate, rigid, .2 in. long. *Calyx* subtubular, .1 in. (in fruit .15 in.) long, ciliate; teeth erect, subequal, subulate, as long as the tube. *Corolla* .2 in. long; tube slender. *Nutlets* ovoid, brown, minutely rugulose. Benth. in DC. Prodr. XII. 107; Miq. Fl. Ind. Bat. II. 959; Hook. f. Fl. Br. Ind. IV. 630.

MALACCA: *Griffith* 3961! PENANG: *King*! SINGAPORE: *Kunstler*! PERAK: *Scortechini*! ANDAMANS: at Port Blair, *King*!—DISTRIB. America, from Brazil to Mexico; Tropical Africa and the Malay Archipelago, introduced.

*Hyptis capitata*, Jacq., a species in habit resembling *H. brevipes*, is frequently met with in gardens in S.E. Asia. It sometimes occurs spontaneously in waste places in India, and appears to have become established in the Philippines and in Formosa. The

possibility of its occurrence in our area should therefore be kept in mind. It is readily distinguished from *H. brevipes* by its much larger capitula, which reach .75 in. across, and by its calyx-teeth being shorter than the tube. There is nothing in the description of the mysterious *Leucas globulifera* (Hassk. Cat. Hort. Bogor. alt. 133), which finds a place in various works of reference and which is obviously not a *Leucas*, to prevent it from having been *Hyptis capitata* in cultivation, as Hasskarl says, at Buitenzorg. Hasskarl's small 2-fid upper lip may stand for the two upper corolla-lobes, the lateral lobes of the lower lip being the two lateral corolla-lobes; the concave mid-lobe, largest of the three in what Hasskarl terms the lower lip, explains itself. Every other character agrees with *Hyptis capitata*, and the combination of characters will fit no other Labiate known to the writer as likely to be in cultivation in Java when Hasskarl wrote.

2. *HYPTIS SUAVEOLENS*, Poit. Ann. Mus. Par. VII. 472, t. 29, f. 2 (1806). A rigid, branching, annual herb, 2 to 4 ft. high. *Stems* hirsute. *Leaves* opposite, firmly herbaceous, dark-green, pilose above, paler, densely grey-pubescent beneath, rather wide-ovate, subacute; base rounded, truncate or slightly cuneate, rarely subcordate; margin sinuate and serrulate; .75 to 3 in. long, .6 to 2 in. wide; petiole slender, .35 to .75 in. long, sparingly pubescent. *Flowers* in lax few-flowered, secund heads, .5 in. long, arranged racemosely towards ends of branches in the axils of smaller leaves, on pubescent peduncles .5 in. long; bracts minute, setaceous. *Calyx* campanulate, .2 in. (in fruit .35 in.) long, strongly ribbed; mouth villous; teeth erect, subulate, shorter than tube. *Corolla* blue, .3 in. long; tube slender. *Nutlets* narrowly oblong, brown, faintly rugose. Benth. in DC. Prodr. XII. 126; Miq. Fl. Ind. Bat. II. 959; Hook. f. Fl. Br. Ind. IV. 630. *Ballota suaveolens*, Linn. Sp. Pl. 815. *Bysteropogon suaveolens*, L'Hérit. Sert. Angl. 19. *B. graveolens*, Blume Bijdr. 824. *Schaueria graveolens*, Hassk. in Flora, 1842, II. Beibl. 25.—Malay name "Ruku."

PERAK: Wray! MALACCA: Maingay 2280! PENANG: Deschamps! NICOBARS: Kurz 26063!—DISTRIB. Tropical America; introduced and widely spread in South-east Asia.

Leaves largely used, along with those of *Urena lobata*, Linn., in adulterating commercial samples of leaves of *Pogostemon Cablin*, the Patchouli plant principally cultivated in our area.

#### 4. *PLECTRANTHUS*, L'Hérit.

Herbs or undershrubs. *Flowers* usually small, generally in lax, paniculate, 6- to 8-flowered cymes. *Calyx* 5-toothed, 2-lipped, enlarging in fruit. *Corolla-tube* exserted, long or short, decurved or straight; limb gibbous or sometimes spurred, less often straight, 2-lipped; lower

lip entire, long boat-shaped; upper short, 3- to 4-fid, recurved. *Stamens* 4, declinate; filaments free, simple; anther-cells usually confluent. *Disk* usually produced anteriorly, there nearly to fully as long as the ovary. *Style* usually 2-fid. *Nutlets* orbicular or occasionally oblong or ovoid, smooth, granulate or punctate.—**DISTRIB.** Species about 100, in the Tropics of the Old World, Australia and Polynesia.

**PLECTRANTHUS KUNSTLERI**, Prain Journ. As. Soc. Beng. LXVI. ii. 521 (1897). A stoutish shrubby plant, 2 to 5 ft. high, everywhere finely puberulous. *Leaves* opposite, membranous, pale-green especially beneath and there sparsely glandular-puberulous, darker and similarly faintly puberulous above, sometimes with a whitish line down the centre, ovate-acute with entire, cuneate base and short, entire, subacuminate apex; margin elsewhere regularly crenate; 3 to 4.75 in. long, 1.5 to 2 in. wide; petiole 1.5 to 2 in. long. *Flowers* in racemed cymes disposed in stout panicles with ascending branches, 6 in. long, 4 in. across. *Calyx* in fruit .2 in. long, gland-dotted; pedicels .15 in. long, finely puberulous; the two lower teeth subulate, the two lateral ovate-acute, longer than the upper orbicular-ovate. *Corolla* greenish-white, or waxy white, faintly dotted, .4 in. long; the tube decurved with a gibbous base, one and a half times as long as the boat-shaped lower lip; upper lip rather short. *Filaments* discrete from the point at which they are free from the corolla-tube. *Nutlets* oblong, brown, hardly shining. Ann. Rôy. Bot. Gard. Calc. IX. i. 55, t. 70.

**PERAK:** Kwala Dipong, 400 to 600 ft. elev., *King's Collector (Kunstler)* 8240! Kinta, 800 to 1000 ft., *King's Collector (Kunstler)* 7143! On limestone ridges.

### 5. COLEUS, Lour.

**Herbs.** *Flowers* usually small, generally in lax, paniculate, 6- to 8-flowered cymes. *Calyx* 5-toothed, 2-lipped, enlarging in fruit. *Corolla-tube* exserted, long or short, decurved or straight; limb gibbous or less often straight, 2-lipped; lower lip entire, long boat-shaped; upper short, 3- to 4-fid, recurved. *Stamens* 4, declinate; filaments combined below into a sheath around the style; anther-cells usually confluent. *Disk* usually produced anteriorly. *Style* usually 2-fid. *Nutlets* orbicular, oblong or ovoid, smooth, granulate or punctate.—**DISTRIB.** Species about 80, in the Tropics of the Old World and in Australia.

**COLEUS ATROPURPUREUS**, Benth. in Wall. Pl. As. Rar. II. 16 (1831). A herb 2 to 3 ft. high, everywhere finely pubescent. *Leaves* opposite, membranous, dark-green above, rather closely puberulous on the nerves, elsewhere sparingly so, paler beneath and pubescent on the main and



secondary nerves, ovate-acute, with entire rounded rarely cuneate base, and short, entire, blunt apex; margins elsewhere rather widely crenate; 2 to 4 in. long, 1.25 to 1.75 in. wide; petiole 1 to 2 in. long. *Flowers* in irregularly branched cymes disposed in stoutish thyrses 3 to 6 in. long, 1.5 in. across; bracts ovate-acute, pubescent, .15 in. long, deciduous. *Calyx* in fruit .2 in. long, sparingly gland-dotted; pedicels .2 in. long, pubescent; the two lower teeth subulate, the two lateral oblong-obtuse, shorter than the upper ovate-subacute. *Corolla* blue and white, .35 in. long; the tube abruptly decurved, shorter than the lower lip; upper lip very short. *Filaments* connate far beyond point of attachment to corolla-tube. *Nutlets* orbicular, brown, almost shining. Benth. Lab. Gen. & Spec. 54 and in DC. Prodr. XII. 74; Wall. Cat. 2733; Nunes Fl. Filip. t. 208; Miq. Fl. Ind. Bat. II. 951; Hook. f. Fl. Br. Ind. IV. 626.

In most of the Provinces.—DISTRIB. Malay Archipelago; Philippines; Polynesia.

# 6. POGOSTEMON, Desf.

Herbs or undershrubs, often strongly scented. *Leaves* usually opposite. *Flowers* small, in simple or paniculate spikes or contracted racemes formed of many dense-flowered subcapitate whorls. *Calyx* almost equally 5-toothed. *Corolla* 2-lipped; upper lip 3-lobed, the lobes subequal or the central one rather longer and narrower than the lateral ones; the lower lip flat, patent, entire. *Stamens* 4, exserted, straight or declinate, the lower pair rather shorter than the upper; filaments bearded; anther-cells confluent. *Disk* subentire, uniform. *Style* shortly 2-fid, the arms subulate, subequal. *Nutlets* smooth, ovoid or ellipsoid.—DISTRIB. Species about 30, throughout South-eastern Asia.

Leaves membranous, sparingly puberulous or almost glabrous; whorls separated by distinct interspaces throughout the spikes; corolla glabrous externally, except for a few hairs on margin of lower lip .. .. .

1. *P. Heyneanus*.

Leaves herbaceous, densely pubescent, especially beneath; whorls contiguous throughout the spikes or only the lowest separated by an interspace; corolla uniformly pubescent externally .. .. .

2. *P. Cablin*.

1. POGOSTEMON HEYNEANUS, Benth. in Wall. Pl. As. Rar. I. 31 (1830). An erect branching herb, 2 to 4 ft. high. *Stems* and branches slender, sparsely pubescent. *Leaves* opposite, thinly membranous, very sparingly puberulous or sometimes almost glabrous on both surfaces,

medium-green above, pale-green beneath, ovate-acute; base wide-cuneate, entire; margin elsewhere crenate, each lobule again crenulate; 2·5 to 4 in. long, 1·5 to 2·75 in. wide; petiole 1 to 1·5 in. long, very sparingly puberulous. *Flowers* in slender, simple or paniculately branching terminal spikes 3 to 6 in. long; whorls at the base ·5 to ·75 in. apart, gradually more approximate upwards, but those near the apex still ·2 to ·15 in. apart; whorls ·4 in. across; bracts elliptic, acute, sparingly puberulous, ·15 in. long or less. *Calyx* ·15 in. (in fruit ·2 in.) long, sparingly pubescent externally; teeth triangular, one-third the length of the tube, equal and similar. *Corolla* ·2 in. long, glabrous externally save for a few hairs on margin of lower lip. *Filaments* exserted, almost straight, all bearded. *Style-arms* short, only one-tenth to one-eighth the length of the style. *Nutlets* wide-ovate, ·02 in. long, dark-brown with a paler base, smooth. Benth. Lab. Gen. & Sp. 154, and in DC. Prodr. XII. 153; Wight Ic. t. 1440; Cooke Fl. Bomb. II. 455. *P. Patchowli*, Dalz. & Gibs. Bomb. Fl. Addend. 66 (not *P. Patchouly*, Pellet.). *P. Patchouli*, Hook. f. Fl. Br. Ind. IV. 633 (not *P. Patchouly*, Pellet.).

SINGAPORE: *G. Thomson*. MALACCA: *Griffith*, 3966! SELANGOR: Rawang, *Ridley* 7603! Cultivated or as an escape from cultivation.—DISTRIB. India and Ceylon; where, however, it is only known as a cultivated plant or as an escape from cultivation.

This, the Indian “Patchouli,” if one may judge from the specimens communicated, is the plant first introduced to our area on account of its peculiar scent. There is nothing to indicate whether it was formerly at all extensively cultivated; it does not appear to be so now.

2. *POGOSTEMON CABLIN*, Benth. in DC. Prodr. XII. 156 (1848). An erect, rather stout, branching undershrub, 2 to 5 ft. high. *Stems* and branches stout, distinctly swollen under the nodes, densely hoary-pubescent. *Leaves* opposite, herbaceous, closely densely pubescent on both surfaces, especially beneath, dark-green above, medium-green below, ovate-acute; base shortly cuneate or subtruncate, entire; margin elsewhere usually deeply lobate, the lobes crenate; rarely margin simply crenate or in upper leaves almost entire; 3 to 4 in. long, 2 to 3 in. wide; petiole 1·5 to 2·5 in. long, densely hoary-pubescent. *Flowers* in stout simple spikes terminating the stem and the branches, 1·5 to 4 in. long, the lowest whorl sometimes ·5 to ·6 in. remote from the next, the rest or all the whorls closely aggregate; whorls ·75 in. across or more; bracts elliptic, acute, densely pubescent, ·2 to ·35 in. long. *Calyx* ·2 in. (in fruit ·25 in.) long, densely pubescent, especially along the nerves; teeth triangular, one-third the length of the tube,

equal and similar. *Corolla* .3 in. long, the throat and lips uniformly pubescent externally. *Filaments* exserted, almost straight, all bearded. *Style-arms* rather long, one-fifth to one-fourth the length of the style. *Nutlets* not seen ripe. *P. Patchouly*, Pellet. in Mem. Soc. Sc. Orleans V. 277, t. 7. *P. suavis*, Ten. in Giorn. Bot. Ital. II. 56. *P. Patchouli*, Hook. Kew Journ. Bot. I. 328, t. 11. *P. Patchouli* var. *suavis*, Hook. f. Fl. Br. Ind. IV. 634. *Mentha Cablin*, Blanco, Fl. Filip. 473. *M. auricularia*, Blanco Fl. Filip. ed. 2, 329 (not of Linn.).

PERAK: *Wray*! PENANG: *Wallich*! *Curtis*! Cultivated only, in our area.—DISTRIB. Philippines; where, according to Loher, it occurs only in gardens.

This plant seems to flower not infrequently in the Philippines; there are specimens from thence at Kew collected both by Vidal and by Loher. So far as is known, it has flowered only three times in Europe: once in France, recorded by Pelletier (1844); once in Italy, recorded by Tenore (1847); once in England, recorded by Sir W. J. Hooker (1849): Hooker's plant was obtained from Tenore. No flowering specimen has ever been communicated from our area where, according to Wray and Curtis, it is extensively cultivated by Chinese settlers. In the Royal Botanic Garden at Calcutta the plant has been in continuous cultivation since 1834, when Wallich first obtained it from Penang; at Saharanpur, whence it was distributed from the Calcutta Garden, it has also been long in cultivation. At Calcutta and at Saharanpur all attempts to induce the plant to flower have consistently failed.

This, which may be termed the Malayan, as opposed to the original or Indian Patchouli, is not known to be cultivated anywhere in India except in botanical gardens.

There are indications that a third kind of Patchouli plant, the Chinese Patchouli (*Microtoena cymosa*, Prain), had at one time been introduced, not impossibly by Chinese settlers, to Java. But its cultivation has not persisted in the Malayan Archipelago, and there is no indication that it was ever introduced to the Peninsula. The Chinese Patchouli seems at one time to have been cultivated to a considerable extent in North-eastern India, and to have competed in the Calcutta market with the Indian Patchouli (*Pogostemon Heyneanus*). Now, however, the Malayan Patchouli, the product of *Pogostemon Cablin*, appears to have so completely supplanted both the others that neither are offered for sale, and the cultivation of *Pogostemon Heyneanus* is restricted to native gardens in the Indian Peninsula, while that of *Microtoena cymosa* only lingers in a few native gardens in the Khasia Hills.

In commercial samples of the leaves of *Pogostemon Cablin*, various extraneous leaves are to be met with. The chief of these are leaves of *Hyptis suaveolens*, Poit., in our area known as "Ruku," also leaves of *Urena lobata*, Linn., known in our area as "Perpulut." With *Hyptis suaveolens*, and under the same name "Ruku," are associated the leaves of *Ocimum Basilicum*, Linn., var. *pilosum*. These, however, are in much smaller quantity than those of the *Hyptis*.

## 7. DYSOPHYLLA, Bl.

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in dense long spikes composed of numerous close-set many-flowered cymes. *Calyx* minute, ovoid, 5-toothed; teeth subequal; throat naked within. *Corolla* minute; tube exserted or included, limb equally 4-fid; upper lobe entire or notched, lower spreading. *Stamens* 4, exserted, straight or nearly so; filaments bearded, very long; anther-cells confluent. *Disk* equal, subentire. *Style* 2-fid. *Nutlets* ovoid or oblong, smooth or granulate.—DISTRIB. Species about 15, in Tropics of Old World and Australia.

DYSOPHYLLA AURICULARIA, Blume Bijdr. 826 (1826). A coarse annual herb. *Stems* laxly branched, rarely simple, 1 to 2 ft. high, pubescent with spreading hairs. *Leaves* opposite, membranous, rather pale-green, especially beneath, with numerous scattered hairs above and with similar hairs on the nerves beneath, ovate or oblong-ovate, acute or rarely obtuse, with entire cuneate or rounded base; margins elsewhere coarsely serrate; 1 to 2.75 in. long, .5 to 1 in. wide; petiole .1 to .4 in. long. *Flowers* in villous cylindric terminal spikes 1.5 to 3 in. long, .2 to .35 in. in diam.; whorls of cymes close-set throughout. *Calyx* in fruit .1 in. long, subcampanulate, gland-dotted; teeth subequal, triangular, incurved over the nutlets. *Corolla* .1 in. long, pinkish; tube slender, much exserted; lobes short, pubescent. *Filaments* exserted, densely villous. *Nutlets* ellipsoid, almost smooth. Benth. Lab. Gen. & Sp. 158, in DC. Prodr. XII. 156, and in Wall. Pl. As. Rar. I. 30; Wall. Cat. 1548; Wight Ic. t. 1445; Hook. f. Fl. Br. Ind. IV. 638. *Mentha auricularia*, Linn. Mant. 81; Roxb. Fl. Ind. III. 4; Griff. Notul. IV. 200. *M. fatida*, Burm. Fl. Ind. 126.

In all the provinces.—DISTRIB. Throughout South-east Asia.

## 8. MENTHA, Linn.

Strongly scented perennial herbs with creeping rootstocks. *Flowers* small, in usually many-flowered terminal spikes or axillary whorls; bracts small or large. *Calyx* tubular or campanulate, 10-ribbed, 5-toothed; teeth subequal. *Corolla-tube* infundibuliform, short; lobes 4, the uppermost rather wider than the other three, emarginate. *Stamens* 4, usually dimorphic, subequal; filaments free, erect, distant; anthers 2-celled; cells parallel. *Disk* entire, uniform. *Style-arms* short, subequal. *Nutlets* ovoid, smooth or reticulate.—DISTRIB. Species variously estimated—perhaps not more than 30 in reality—mainly in North Temperate regions, but some now widely dispersed in all parts of the world.

MENTHA JAVANICA, Blume Bijdr. 826 (1826). A prostrate herb, rooting

below. *Stems* 1 to 2 ft. long, pubescent with reflexed adpressed hairs. *Leaves* opposite, membranous, harshly hairy above, glabrous beneath, rather wide-lanceolate, acute; base long-cuneate, entire; margin elsewhere serrate; 1 to 2 in. long, .25 to .35 in. wide; petiole .25 in. long or shorter; floral leaves like those on the stem below the whorls. *Flowers* in axillary capitate distant whorls; bracts acute, shorter than the flowers. *Calyx* .1 in. long, tubular-campanulate, adpressed-pubescent; teeth lanceolate, acute, longer than the tube. *Corolla* .15 in. long, pubescent. Benth. in DC. Prodr. XII. 173. *M. sativa*, Roxb. Fl. Ind. III. 6 (*hardly* of Linn.). *M. arvensis*, Thw. Enum. Pl. Zeyl. 239; Trim. Fl. Ceyl. III. 381 (*hardly* of Linn.). *M. arvensis* var. *javanica*, Hook. f. Fl. Br. Ind. IV. 648.

MALACCA: *Griffith!*—DISTRIB. Ceylon; Java; Philippines.

Apparently rare, and possibly an introduced plant in our area, seeing that it has never been reported since Griffith met with it. As Sir J. D. Hooker remarks, this, which is Roxburgh's *M. sativa*, may really be a form of *M. sativa*, Linn., and, if so, may only be a state of *M. arvensis*, Linn., to which Boissier refers *M. sativa*, and to which Thwaites refers the present plant. For the purposes of a local flora, however, it seems better to keep this form, which is easily recognized, apart as a distinct species.

#### 9. CALAMINTHA, Moench.

Herbs or shrubs. *Flowers* small or medium, in dense axillary or loose spicate or racemose or paniced whorls. *Calyx* 13-nerved, 2-lipped; lower lip 2-toothed, teeth narrow; upper lip 3-toothed, teeth wider and more highly connate; throat naked or villous. *Corolla-tube* straight, throat villous; lower lip spreading, 3-lobed; upper lip erect, flattish. *Stamens* 4, didynamous, ascending under upper lip, the upper pair sometimes imperfect; anther-cells parallel or divaricate. *Disk* uniform, entire. *Style-lobes* equal or the upper smaller. *Nutlets* minute, subglobose, smooth.—DISTRIB. Species about 40, in North Temperate regions.

CALAMINTHA GRACILIS, Benth. in DC. Prodr. XII. 232 (1848). A slender prostrate herb. *Stems* 8 to 12 in., faintly puberulous, rooting below. *Leaves* opposite, membranous, glabrous on both sides, dark-green above, paler beneath, ovate-subacute; base rounded or shortly cuneate, entire; margin elsewhere serrate; .4 to .6 in. long, .3 to .5 in. wide; petiole .25 in. long, puberulous. *Flowers* in lax many-flowered whorls in axils of uppermost leaves, and there remote or aggregated in racemose or subcapitate terminal racemes, with rachis sparsely pubescent; bracteoles subulate, finely puberulous, half as long as slender pedicels. *Calyx* .12 in. (in fruit .17 in.) long; tube slightly inflated below; lower teeth subulate, ciliate, incurved; upper lip shortly 3-toothed, recurved; teeth

ovate; pedicels .12 in. long, puberulous. *Corolla* .2 in. long. *Nutlets* .02 in., pale-brown, smooth.

PERAK: Thaiping, *Ridley* 11912!—DISTRIB. Java; Assam.

This species is not included in the 'Flora of British India.' It was obtained by the late Mr. C. B. Clarke, at Dibrugarh in Upper Assam, subsequent to the appearance of the account of the Indian species of this family by Sir Joseph Hooker.

#### 10. SALVIA, Linn.

Herbs, undershrubs or shrubs. *Flowers* small, medium, or large and showy; whorls usually in racemes or spikes; bracts small or large, sometimes coloured. *Calyx* campanulate or tubular, 2-lipped; mouth naked; upper lip entire or 3-toothed; lower lip 2-fid. *Corolla* 2-lipped; tube naked or annulate within; lower lip 3-lobed, the central lobe usually wider than the lateral, entire or emarginate; upper lip erect. *Stamens* 2, the upper pair imperfect, represented by small staminodes or obsolete; filaments short, articulating with a slender connective, and sometimes produced beyond the joint; connective linear, transverse, with an upper ascending arm which bears a linear fertile anther-cell, and a lower straight or deflexed arm bearing a cell which may be empty or fertile or bearing no cell. *Disk* usually enlarged anteriorly. *Style* shortly 2-fid; the lobes usually subulate, equal or the lower larger, sometimes flattened. *Nutlets* ovoid, somewhat triquetrous, smooth.—DISTRIB. Species about 450, cosmopolitan.

Flowers rather large, showy; corolla-tube long, far exserted .. 1. *S. coccinea*.  
Flowers minute, inconspicuous; corolla-tube short, not exserted .. 2. *S. plebeia*.

1. *SALVIA COCCINEA*, JUSS. ex Murr. in Comm. Gott. I. 86, t. 1 (1778). A slender herb, 1 to 3 ft. high. *Stems* numerous, 4-angled, ascending, often branched, finely pubescent. *Leaves* opposite, membranous, glabrous above, finely white-pubescent beneath, dark-green, ovate- or cordate-acute, crenate except the base; 1 to 1.5 in. long, .75 to 1 in. wide; petiole slender, finely puberulous, .6 to .8 in. long. *Flowers* in 6- to 10-flowered remote whorls disposed in terminal racemes; bracts ovate-acuminate, deciduous; pedicels .12 in. long, slender, puberulous. *Calyx* .25 in. (in fruit .35 in.) long, pubescent, striate, narrowly campanulate; upper lip entire, obtuse; lower 2-fid; the lobes acute. *Corolla* .75 in. long, red; tube straight, much exserted, widened upwards; lower lip spreading, 3-fid; upper lip short, erect. *Nutlets* .08 in. long, very narrowly oblong, smooth, brown, shining. Linn. f. Suppl. 88; Benth. in DC. Prodr. XII. 343; Hook. f. Fl. Br. Ind. IV. 656. *S. Gerardiana*, Benth. in Wall. Cat. 2150.

SINGAPORE: *Kurz!* MALACCA: *Maingay* 1167! 1778! ANDAMANS: Port Blair, *Kurz!*—DISTRIB. America, where indigenous; Africa and South-east Asia, where generally cultivated and often as an escape from gardens.

2. *SALVIA PLEBEIA*, R. Br. Prodr. 501 (1810). An erect herb, 6 to 18 in. high. *Stems* obtusely 4-angled, grooved, hoary-pubescent. *Leaves* opposite, membranous, sparsely hirsute or nearly glabrous, oblong-oblancoelate, obtuse or subacute; base usually cuneate, entire; margin elsewhere irregularly crenate; 2 to 4 in. long, .75 to 1.75 in. wide; petiole 1 to 2 in. long. *Flowers* in paniculate or subthyrsoid, interrupted, pubescent, spike racemes; bracts small, linear-spathulate; pedicels short. *Calyx* .1 to .12 in. (in fruit .18 to .2 in.) long, campanulate, 2-lipped; upper lip obtuse, entire, lower 2-fid; the lobes acute or subacute. *Corolla* small, .15 in. long, whitish; lower lip 3-lobed, the mid-lobe exceeding the lateral ones; upper lip oblong, obtuse. *Nutlets* .04 in. long, ovoid, smooth, brown. Benth. Lab. Gen. & Sp. 309, and in DC. Prodr. XII. 355; Miq. Fl. Ind. Bat. II. 970; Hook. f. Fl. Br. Ind. IV. 655. *S. brachiata*, Roxb. Fl. Ind. I. 145; Wall. Cat. 2149.

MALACCA: perhaps also in some of the other provinces.—DISTRIB. South-east Asia generally; Australia. A very common Indian field-weed, but in our area apparently extremely rare and perhaps only introduced.

# 11. SCUTELLARIA, Linn.

Herbs or undershrubs. *Flowers* often in long narrow racemes. *Calyx* campanulate, 2-lipped; lips closed in fruit, ultimately free to the base, the upper at length deciduous, with a deciduous dorsal scale or pouch, the lower persistent. *Corolla* 2-lipped; tube long, usually abruptly recurved beyond the calyx and ascending, dilated at the throat, not annulate within; lower lip wide, 3-lobed, the lateral lobes small and often connate with upper lip, which is erect, galeate, entire or notched. *Stamens* 4, didynamous, the upper pair shorter, ascending under the hooded upper lip; anthers connivent, ciliate, those of upper stamens 2-celled, of lower 1-celled. *Disk* elongate. *Style* 2-fid; upper lobe very short. *Nutlets* subglobose, smooth, granulate or hispidulous.—DISTRIB. Species about 90, mainly in the Northern Hemisphere.

Pubescent; leaves purple beneath; corolla pale-blue	..	1. <i>S. discolor</i> .
Glabrous; leaves green beneath; corolla dark-blue, with white		
centre of lower lip	.. .. .	2. <i>S. andamanica</i> .

1. *SCUTELLARIA DISCOLOR*, Colebr. in Wall. Pl. As. Rar. I. 66 (1830). A slender pubescent herb. *Stems* ascending from a creeping rootstock, 1 to 2 ft. high; rarely branched, often naked above. *Leaves* opposite, and crowded towards the base of the stem, pubescent on both sides, often purple beneath, elliptic, obtuse; base rounded or cordate; margin crenate; 1·5 to 4 in. long, ·75 to 2·5 in. wide; petioles 1 to 3 in. long. *Flowers* disposed in slender racemes 2 to 8 in. long; rachis pubescent; bracts ·1 to ·15 in. long; pedicels ·1 in. long. *Calyx* ·12 in. (in fruit ·2 in.) long, pubescent. *Corolla* pale-blue, faintly puberulous externally, ·5 to ·6 in. long; tube ·4 in. long; throat somewhat dilated; lower lip 3-lobed; upper lip galeate, obtuse. *Nutlets* ·03 in. long, scabrid. Benth. in DC. Prodr. XII. 417; Hook. f. Fl. Br. Ind. IV. 667. *S. indica*, Blume Bijdr. 839; Wall. Cat. 2134 (*not of* Linn.). *S. heteropoda*, Miq. Fl. Ind. Bat. II. 972.

PERAK: *Scortechini*. — **DISTRIB.** India; Indo-China; Malay Archipelago.

2. *SCUTELLARIA ANDAMANICA*, Prain Journ. As. Soc. Beng. LIX. ii. 307 (1890). A slender glabrous undershrub. *Stems* many from a woody rootstock with clustered rootlets, 8 to 10 in. high, simple or branched. *Leaves* opposite, rather few, oblong-lanceolate, obtuse; base long-cuneate, entire; margin elsewhere crenate-dentate; 1·5 to 1·75 in. long, ·4 to ·6 in. wide; petiole 1 to 1·5 in. long. *Flowers* opposite above, in whorls of three below, in slender racemes 3 to 4 in. long; bracts ·12 in. long; pedicels ·12 in. long. *Calyx* ·12 in. (in fruit ·2 in.) long, glabrous. *Corolla* blue, with centre of lower lip white; ·6 in. long; throat little dilated; lower lip 3-lobed; upper lip galeate. *Nutlets* ·04 in. long, scabrid, pale-brown. Ann. Roy. Bot. Gard. Calc. IX. i. 56, t. 71 A.

ANDAMANS: Port Blair, in stream beds, not uncommon.

## 12. ANISOMELES, R. Br.

Herbs, with tall coarse branching *stems*. *Flowers* medium, in axillary whorls, or in lax branching paniculate cymes. *Calyx* ovoid or tubular, straight, equally 5-toothed. *Corolla-tube* short, annulate within; lower lip 3-lobed, broad and patent, the mid-lobe retuse or notched; upper lip entire, erect. *Stamens* exserted; anthers connivent, those of the lower and longer pair dimidiate; of the shorter upper pair 2-celled; the cells parallel, transverse. *Disk* equal. *Style* subequally 2-fid. *Nutlets* smooth.—**DISTRIB.** Species about 8, South-eastern Asiatic and Australian.



Stems and branches acutely 4-angled, softly pubescent to glabrate; corolla pale-purple; calyx-teeth about as long as the tube .. .. . 1. *A. ovata*.

Stems and branches obtusely 4-angled, densely white woolly; corolla dark-purple; calyx-teeth much shorter than the tube .. 2. *A. malabarica*.

1. *ANISOMELES OVATA*, R. Br. in Ait. Hort. Kew. ed. 2, III. 364 (1811). A stoutish shrubby plant, with acutely 4-angled stems and branches, 2 to 5 ft. high, sparingly hairy to densely pubescent or almost woolly. *Leaves* opposite, thickly herbaceous, uniformly hairy to woolly-tomentose on both sides, rather pale-green; ovate-acute with entire truncate, rounded, or subcordate, less often shortly cuneate base; margin elsewhere crenate-serrate; 1·5 to 4 in. long, 1 to 2·25 in. wide, rarely rather larger low down on the stem; petiole ·6 to 1·5 in. long. *Flowers* in dense whorls, distant below, approximate above in a dense spicate inflorescence; in fruit the cymes sometimes subsecundly explanate; bracts ·15 to ·2 in. long, linear, beset with long firm hairs. *Calyx* ·25 in. (in fruit ·35 in.) long, subsessile, hirsute with firm hairs; teeth lanceolate, acute, almost as long as tube, hairy within and without, ciliate. *Corolla* ·6 in. long, light-purple with blue lower lip; tube ·2 in. long; lower lip 4-lobed from deep division of the middle segment into two oblong lobes; the lateral lobes small, rounded; upper ·25 in. long, oblong, entire. *Filaments* hirsute. *Nutlets* ·1 in. long, wide-ovate, subcompressed; inner face bluntly angular, outer rounded, smooth, shining, nearly black. Wall. Cat. 2040; Jacq. Eclog. I. t. 86; Hook. Bot. Misc. II. 358, Suppl. t. 19; Benth. in Wall. Pl. As. Rar. I. 59, and in DC. Prodr. XII. 455; Wight Ic. t. 865; Miq. Fl. Ind. Bat. II. 975; Hook. f. Fl. Br. Ind. IV. 672. *A. disticha*, Heyne in Roth Nov. Sp. 254; Roxb. Fl. Ind. III. 2. *A. glabrata*, Benth. in Wall. Cat. 2041. *A. mollissima*, Wall. Cat. 2039. *A. indica*, O. Kuntze Rev. Gen. 512. *Nepeta indica*, Linn. Sp. Pl. 571. *N. amboinica*, Linn. f. Suppl. 273. *N. disticha*, Blume Bijdr. 823. *Ballota disticha*, Linn. Mant. 83. *B. mauritiana*, Pers. Syn. II. 126. *Ajuga disticha*, Roxb. Fl. Ind. III. 2. *Marrubium indicum*, Burm. Fl. Ind. 127. *M. odoratissimum*, Burm. Thes. Zeylan. t. 71, f. 1. *Monarda zeylanica*, Burm. Fl. Ind. 12.

In all the provinces, in waste places.—DISTRIB. South-eastern Asia generally; China.

A very variable plant as regards tomentum; the extreme forms being *A. glabrata*, Benth., which is only sparsely hairy, and *A. mollissima*, Wall., which is densely softly woolly-pubescent. The two forms mentioned are probably deserving of separation as varieties; intermediate states, however, occur.

2. *ANISOMELES MALABARICA*, R. Br. in Bot. Mag. t. 2071 (1819). An erect shrubby plant, with obtusely 4-angled stems and branches, 4 to 6 ft. high, densely tomentose or thickly woolly. Leaves opposite, very thickly herbaceous, pale-green above, white below, uniformly softly woolly tomentose, oblong-lanceolate, acute, with entire rounded or shortly cuneate base; margin elsewhere crenate-serrate; 2·5 to 4 in. long, ·75 to 1·75 in. wide; petiole ·5 in. long, stout, softly woolly. Flowers in dense whorls, distant below, approximate above, often 1·25 in. across, forming an interrupted spicate inflorescence; bracts ·4 to ·5 in. long, linear, acute, densely softly woolly. Calyx ·3 in. (in fruit ·4 in.) long, subsessile, densely villous; teeth about half as long as tube, narrowly lanceolate, acute, villous externally and internally, ciliate. Corolla ·8 in. long, dark-purple, somewhat pubescent externally; tube ·35 in. long; lower lip 4-lobed from deep division of the middle segment into 2 oblong obtuse lobes; upper lip ·35 in. long, obtuse. Filaments pubescent. Nutlets ·12 to ·15 in. long, ellipsoid, compressed, inner face faintly angled, outer rounded, smooth, shining, brown. Wall. Cat. 2037; Hook. Journ. Bot. I. 225, t. 127; Wight Ic. t. 864; Benth. in Wall. Pl. As. Rar. I. 59, in Lab. Gen. & Sp. 704, and in DC. Prodr. XII. 456; Hook. f. Fl. Br. Ind. IV. 673. *A. intermedia*, Wight in Benth. Lab. Gen. & Sp. 703; DC. Prodr. XII. 456. *Nepeta malabarica*, Linn. Mant. 566. *Ajuga fruticosa*, Roxb. Fl. Ind. III. 1.

PENANG: Wallich 2037! Ayer Etam, Tat's Corner, Curtis 3741!—DISTRIB. Drier parts of India and Ceylon; Mauritius, where it is probably an introduced species.

The fact that this plant is in our area confined, so far as is known, to Penang, makes it not improbable that we have here to deal with an introduced species. It is a common and characteristic plant of the Deccan and of the drier region of Ceylon, but does not occur elsewhere in India.

### 13. *LEONOTIS*, R. Br.

Herbs or shrubs, usually tall and coarse. Flowers large, in many-flowered axillary whorls; bracts numerous, slender. Calyx 10-nerved; tube often incurved; mouth oblique, with 8 to 10 rigid teeth, the uppermost longer than the rest. Corolla-tube included or exerted; lower lip small, 3-lobed, the mid-lobe largest; upper lip long, concave, villous above. Stamens 4, didynamous, ascending under upper lip, lower pair longer; anthers connivent; the cells divaricate. Disk equal. Style subulate, with very short upper lobe. Nutlets obovoid or oblong or ovoid, truncate or rounded at the apex, glabrous.—DISTRIB. Species about 12, mostly confined to Africa, the present one occurring also in Asia and America, where probably it was originally introduced.

LEONOTIS NEPETIFOLIA, R. Br. in Ait. Hort. Kew. ed. 2, III. 409 (1811). A tall erect annual herb, 4 to 7 ft. high, with stout obtusely thickly 4-angled *stems* deeply furrowed between the angles, finely pubescent. *Leaves* opposite, membranous, ovate-acute; base shortly cuneate and decurrent on the petiole, entire; margin elsewhere coarsely crenate-serrate, finely pubescent above and below, 2·5 to 6 in. long, 1·5 to 4 in. wide; petiole 1 to 4 in. long, winged near apex. *Flowers* in dense globose, axillary, many-flowered whorls 1·5 to 2·5 in. across; floral leaves lanceolate, deflexed; bracts linear, strongly spinescent at the apex, deflexed, pubescent, the longest ·5 in. long or longer. *Calyx* ·6 in. (in fruit ·75 in.) long, tubular, incurved, strongly ribbed, puberulous below, densely pubescent above, where also hispid with long white hairs, reticulately veined within, glabrous; teeth 8 to 9, unequal, the uppermost ·35 in. long, ovate-acute, much exceeding the triangular others, all with spinescent tips. *Corolla* 1 in. long, orange-scarlet; tube ·5 in. long, glabrous near base, densely beset above with orange-scarlet pubescence, 3-annulate within with transverse bands of white hairs; lower lip ·15 to ·2 in. long, with 3 oblong obtuse lobes, the mesial rather the largest; upper lip ·5 in. long, densely villous with orange-scarlet hairs. *Nutlets* ·15 in. long, oblong-obovoid, obliquely truncate and pitted at apex. Benth. in Wall. Pl. As. Rar. I. 59, in Lab. Gen. & Sp. 618, and in DC. Prodr. XII. 535; Wall. Cat. 2042; Wight III. II. t. 176 B; Wight Ic. t. 867; Bot. Reg. t. 281; Bot. Mag. t. 3700; Miq. Fl. Ind. Bat. II. 984; Hook. f. Fl. Br. Ind. IV. 691. *Phlomis nepetæfolia*, Linn. Sp. Pl. 586; Roxb. Fl. Ind. III. 8 (sph. *repetifolia*).

In some of the provinces, as an escape.—DISTRIB. Tropical Africa, where probably indigenous, but also widespread in South-eastern Asia and occurring in Tropical America.

#### 14. LEUCAS, R. Br.

Herbs or undershrubs. *Flowers* medium or small, in dense axillary, usually distant, less often terminal whorls. *Calyx* 10-nerved, often striate; mouth equal or oblique; teeth 6 to 10, usually unequal. *Corolla-tube* not exerted, annulate or not within; lower lip 3-fid, spreading, mid-lobe large; upper lip erect, concave, villous externally. *Stamens* 4, didynamous, the upper pair shorter, ascending under upper lip; anthers connivent; cells divaricate, ultimately confluent. *Disk* entire or lobed, uniform or enlarged anteriorly. *Style* subulate; upper lobe minute or obsolete. *Nutlets* ovoid, triquetrous, obtuse.—DISTRIB. Species about 100, chiefly in Tropics of Old World.

Whorls numerous, distant, axillary; calyx-teeth long, slender; corolla small; tube not annulate within .. .. 1. *L. martinicensis*.

Whorls few, usually all or nearly all terminal; calyx-teeth short; corolla medium; tube annulate within near the middle:—

Whole plant sparingly beset with hispidulous hairs; calyx-mouth obliquely campanulate, not contracted; teeth erect .. 2. *L. zeylanica*.

Whole plant smooth, finely puberulous; calyx-mouth projecting above in a large triangular lip, with the small teeth ascending along its margins, the mouth below forming a rounded sinus .. .. 3. *L. lavandulifolia*.

1. *LEUCAS MARTINICENSIS*, R. Br. Prodr. 504 (1810). A tall, stout, annual herb, 2 to 4 ft. high, more or less branched. *Stem* and branches hirsute, 4-angled and 4-grooved, angles rounded. *Leaves* opposite, membranous, hirsute above and below, ovate, oblong or wide-lanceolate, obtuse; base cuneate, rarely rounded, entire; margin elsewhere widely and rather deeply crenate; 2·5 to 3·5 in. long, 1 to 1·75 in. wide; petiole hirsute, 4 to 7 in. long. *Flowers* sessile, in numerous, distant, axillary, globose, many-flowered whorls which are 75 to 1·25 in. across; the floral leaves decreasing upwards, especially in width of blade and length of petiole; bracteoles green, 25 to 35 in. long, narrowly linear-lanceolate or subulate, spinescent at their tips with pale slender awns. *Calyx* 4 in. (in fruit 6 in.) long, tubular, sigmoid, pubescent externally; tube within glabrous and closely reticulate; mouth with a few short villi within, oblique; teeth 10, all lanceolate, ciliate, with fine spinescent tips; the uppermost largest, 2 in. long; the others alternately longer and shorter, 1 and 12 in. long. *Corolla* white, small, 35 in. long; tube 2 in. long, not annulate within; lower lip spreading, the lateral lobes oblong rounded, wider than the oblong 2-fid central; upper lip erect, white-villous. *Nutlets* 1 in. long, obovoid-oblong, obliquely truncate at apex, angular on inner face, rounded on outer, dark-brown, shining. Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 617, and in DC. Prodr. XII. 533; Miq. Fl. Ind. Bat. II. 983; Hook. f. Fl. Br. Ind. IV. 688. *L. polycephala*, Wall. Cat. 2051. *Phlomis martinicensis*, Sw. Prodr. Veg. Ind. Occ. 88.

PERAK: in waste places, *Scortechini*!—DISTRIB. Tropical America; Tropical and South Africa; India and Indo-China.

An introduced and as yet apparently a rare plant in our area.

2. *LEUCAS ZEYLANICA*, R. Br. Prodr. 504 (1810). An erect annual herb, 6 to 20 in. in height, simple or branched. *Stems* and branches 4-angled, hispidulous with scattered spreading hairs. *Leaves* opposite, decussate, membranous, dark-green above, uniformly but sparsely beset

with spreading hispidulous hairs, paler and subglaucescent beneath, with spreading hispidulous hairs on the nerves, the hairs on both sides curved towards leaf-apex, ovate-lanceolate, or occasionally lanceolate, acute; base long-cuneate, entire; margin elsewhere entire or remotely and sparingly serrate; 1·5 to 3 in. long, ·25 to ·5, rarely ·75 in. wide; petiole ·1 to ·2 in. long, hispidulous. *Flowers* sessile or subsessile, in terminal usually 6- to 8-leaved whorls ·5 to ·75 in. across, occasionally also axillary whorls occur below; bracts ·25 in. long, linear, spinescent, hispidulous along the margin with stiff spreading hairs. *Calyx* ·2 in. (in fruit ·3 in.) long, turbinate, slightly curved; the tube below glabrous or faintly pubescent externally, above beset with scattered, spreading, hispidulous hairs; the mouth subcampanulate, oblique, distinctly transversely veined between the 10 nerves, and sparingly pubescent within with short white hairs, the uppermost of which project beyond the limb; teeth 8, the uppermost ·05 in. long, slightly longer than the others, all subulate, spinescent at the tip. *Corolla* white, medium, ·5 in. long; tube ·25 in. long, glabrous below, enlarged upwards where pubescent externally, annulate within near the middle; lower lip patent, the mid-lobe large, shortly widely clawed, the lateral lobes small; upper lip obovate, white-woolly. *Nutlets* ·15 in. long, obovoid-oblong; apex subtruncate; inner face angular, outer rounded; dark-brown or black, shining. Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 614, and in DC. Prodr. XII. 531; Wight Ill. t. 176; Hook. f. Fl. Br. Ind. IV. 689. *L. involucrata*, Benth. in Wall. Cat. 2047. *L. dimidiata*, Benth. in DC. Prodr. XII. 532 (*probably not of Spreng. Syst. II. 743*). *L. nutans*, Benth. in Wall. Pl. As. Rar. I. 60 (*not of Spreng.*); Wall. Cat. 2523 (*not of Spreng.*). *L. malayana*, Hance in Walp. Ann. III. 269. *L. bancana*, Miq. Fl. Ind. Bat. Suppl. 572; Hallier f. Ann. Jard. Bot. Buitenz. XIII. 293. *L. aspera*, Hook. f. Fl. Br. Ind. IV. 690 (*in part; not of Spreng.*). *Phlomis zeylanica*, Linn. Sp. Pl. ed. 2, 820. *Leonurus Marrubiastrum*, Burm. Fl. Ind. 127 (*not of Linn.*).

SINGAPORE: in waste places, frequent, *G. Thomson!* Kurz 2906! *Deschamps!* MALACCA: *Griffith!* — DISTRIB. Throughout South-eastern Asia.

3. *LEUCAS LAVANDULIFOLIA*, Smith in Rees Cyclop. XX. n. 2 (1819). An erect, slender, annual herb, 1 to 2 ft. high, usually branching. *Stems* and branches 4-angled, finely adpressed-puberulous. *Leaves* opposite, herbaceous, finely puberulous on both surfaces, rather pale-green, linear-lanceolate, less often lanceolate, subacute; base tapering gradually from about the middle, entire; margin elsewhere entire in linear-lanceolate leaves, sometimes remotely and sparingly serrate in lanceolate ones; petiole usually very short or obsolete, rarely as much as ·35 in. long.

*Flowers* subsessile or shortly pedicelled, in axillary and terminal but always leafy whorls, and always towards apex of stem and branches, .4 to .6 in. across; bracts .2 to .3 in. long, narrowly linear, subspinescent, finely puberulous. *Calyx* .35 in. (in fruit .45 in.) long behind, .2 to .25 in. long in front, sparingly puberulous or glabrous externally; tube curved; mouth pubescent within with adpressed white short hairs, contracted, very oblique, rounded below, and forming above a large acute lobe much produced forward and tipped by a minute spinescent tooth; the remaining teeth variable in number, also minute, distant, erect along the oblique margin, usually 3, occasionally 4, sometimes only 2 on each side, with often a small tooth in the centre of the rounded sinus opposite the acute posterior lobe. *Corolla* white, medium, .5 in. long; tube .25 in. long, annulate within near the middle; lower lip patent, the mid-lobe large, obovate, rounded, lateral lobes small; upper lip oblong, white-woolly. *Nutlets* .12 in. long, oblong, rounded at apex; inner face angular, outer rounded; pale-brown, dull. *L. linifolia*, Spreng. Syst. II. 743 (1825); Wall. Cat. 2048; Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 617, and in DC. Prodr. XII. 533; Miq. Fl. Ind. Bat. II. 983; Hook. f. Fl. Br. Ind. IV. 690. *Phlomis linifolia*, Roth Nov. Sp. 260 (1821). *P. zeylanica*, Roxb. Fl. Ind. III. 9; Jacq. Ic. Pl. Rar. I. 11, t. 111 (not of Linn.). *Leonurus indicus*, Burm. Fl. Ind. 127. *Herba admirationis*, Rumph. Herb. Amboin. VI. t. 16, f. 1.

PENANG: Penara Bukit, *Curtis* 1115! SINGAPORE: in cultivated ground, *G. Thomson*! *Kunstler* 48! — **DISTRIB.** South-eastern Asia generally; Mascarenes (Madagascar, Mauritius, Réunion, Seychelles).

The calyx-mouth of this species has been described in works of much authority as glabrous within; it is pubescent within.

## 15. LEONURUS, Linn.

Stout, erect, leafy herbs, with lobed leaves. *Flowers* small, in densely congested, axillary distant whorls. *Calyx* turbinate, 5-nerved, with 5 spreading spinescent teeth. *Corolla-tube* naked or annulate within; lower lip 3-fid, with obcordate mid-lobe; upper lip entire, erect. *Stamens* 4, didynamous, ascending under upper lip, lower pair longer; anthers connivent; the cells parallel, transverse. *Disk* uniform. *Style* equally 2-fid; the lobes obtuse or subulate. *Nutlets* smooth, dry, truncate at the apex.—**DISTRIB.** Species 10; almost cosmopolitan.

LEONURUS SIBIRICUS, Linn. Sp. Pl. 584 (1753). A rather coarse annual herb, with obtusely 4-angled, furrowed, usually softly pubescent stems, 2 to 6 ft. high. *Leaves* opposite, herbaceous, palmatipartite, with linear incised segments, dark-green and glabrous or nearly so

above, paler and more or less pubescent on the nerves beneath; 1·5 to 4 in. long, 1 to 3 in. wide; petiole 1 to 2 in. long. *Flowers* in axillary whorls; the upper floral leaves usually entire; bracts ·5 in. long, spinescent. *Calyx* ·25 in. (in fruit ·35 in.) long, glabrous or sparingly pubescent; tube ·2 in. long; teeth spinescent from a shortly triangular base. *Corolla* ·4 to ·5 in. long, red; tube ·25 in. long, annulate within; lower lip 3-lobed, mid-lobe obcordate, the lateral lobes rounded; upper lip obovate, galeate, entire, pubescent. *Filaments* exserted. *Nutlets* ·1 in. long, triquetrous, truncate. Wall. Cat. 2071; Benth. in DC. Prodr. XII. 501; Miq. Fl. Ind. Bat. II. 978; Hook. f. Fl. Br. Ind. IV. 678. *L. tataricus*, Burm. Fl. Ind. 127; Roxb. Fl. Ind. III. 8 (*not of* Linn.)

In some of the provinces, in waste places; an introduced weed of waysides and waste places.—DISTRIB. Originally Asiatic, now almost cosmopolitan.

Though described by Bentham, and by Hooker, *ll.cc.*, as not annulate, the corolla-tube of this species is distinctly annulate within. The annulus is slightly oblique, rather higher anteriorly, and is slightly imperfect, there being a small hiatus behind where the style comes in contact with the corolla-tube.

#### 16. PARAPHLOMIS, Prain.

Herbs or shrubs. *Leaves* membranous. *Flowers* medium, yellow or whitish, in dense axillary, many-flowered whorls; bracteoles numerous, filiform. *Calyx* 10-nerved, equally 5-toothed; tube slightly incurved. *Corolla-tube* annulate within; upper lip erect, pubescent externally, quite glabrous within; lower lip spreading, 3-lobed. *Stamens* 4, ascending under upper lip, lower pair longer; all filaments without basal appendages; anthers connivent; cells divaricate. *Disk* uniform, entire. *Style* 2-fid, lobes subequal or the upper shorter than lower. *Nutlets* obovoid, triquetrous below, rounded above, glabrous.—DISTRIB. Species 3; two Malayan, one extending from the Eastern Himalaya to the Philippines.

PARAPHLOMIS RUGOSA, Prain in Ann. Roy. Bot. Gard. Calc. IX. i. 60 (1901). A coarse shrubby plant, 2 to 3 ft. high. *Stems* stout or slender, minutely hirsute with deflexed hairs. *Leaves* opposite, membranous, dark-green above, paler beneath, glabrous or with minute scattered hairs on the upper surface, elliptic or oblong-ovate, acuminate; base cuneate or truncate, entire; margin elsewhere shortly toothed, 6 to 8 in. long, 3 to 4 in. wide; petiole slender, 2 to 4 in. long. *Flowers* in small distant or rather approximate whorls, axillary and

also often many on the stem below the leaves, .75 to 1.25 in. across; bracteoles filiform, glabrescent, rather shorter than the calyx, .3 in. long. *Calyx* .4 in. (in fruit .5 in.) long, obconic-campanulate; tube slightly curved forwards, glabrous upwards where thickly membranous, usually hispid towards the coriaceous base; teeth 5, slender, lanceolate, from a triangular membranous base, two-thirds the length of the tube, glabrous. *Corolla* pale-yellow or white, 1 in. long, with a distinct annulus within; both lips pubescent externally; lower 3-lobed with oblong mid-lobe and lanceolate lateral lobes; upper narrow, rounded at apex, half the length of the tube, glabrous within. *Filaments* all devoid of basal appendages. *Style-arms* subequal. *Nutlets* .25 in. long, obovoid, acute below and triquetrous, rounded above, glabrous. *Phlomis rugosa*, Benth. in Wall. Cat. 2067, in Wall. Pl. As. Rar. I. 63, in Lab. Gen. & Sp. 634, and in DC. Prodr. XII. 545; Hook. f. Fl. Br. Ind. IV. 693; Prain Ann. Roy. Bot. Gard. Calc. III. 231; IX. i. 60. *Gomphostemma membranifolium*, Miq. Fl. Ind. Bat. II. 988.

PERAK: Kinta, on limestone rocks, *King's Collector (Kunstler)* 7095! *Scortechini*!—DISTRIB. Eastern Himalaya; Indo-China; Malay Archipelago; Philippines.

The specific name applied to this plant by Mr. Bentham is, as Sir Joseph Hooker remarks, wholly inapplicable. Its characters are so different from those of the genus *Phlomis*, and its habit so unlike that of any member of that genus, that it is necessary to consider it the type of a distinct genus.

## 17. GOMPHOSTEMMA, Wall.

Coarse, stellately pubescent or tomentose perennial herbs or shrubs. *Roots* sometimes tuberous. *Flowers* large or medium, in 6- to 24-flowered whorls, sessile and densely or peduncled and laxly cymose; bracteoles lanceolate or linear. *Calyx* campanulate, 10-nerved, subequally 5-toothed. *Corolla-tube* slender; throat inflated; limb 2-lipped; lower lip spreading, broadly 3-lobed; upper lip galeate, entire or emarginate. *Stamens* 4, pubescent, the lower longer, all ascending; anthers connivent in pairs, 2-locular; cells transverse, parallel. *Disk* subequal or gibbous behind. *Style* 2-fid; the lobes subulate, the anterior slightly the longer. *Nutlets* drupaceous, glabrous or pubescent, the pericarp usually fleshy and white, with a broad hilum; rarely all developed.—DISTRIB. Species 26, South-eastern Asiatic.

Corolla with almost straight tube and narrow throat; calyx-tube hispidly hairy within; ovary glabrous; nutlets solitary, glabrous (§ *STENOSTOMA*):—



- Calyx-teeth triangular, much shorter than the tube; whorls few-flowered, densely congested; flowers yellow .. .. 1. *G. microcalyx*.  
 Calyx-teeth linear-subulate, longer than the tube; whorls many-flowered, laxly cymose; flowers yellow .. .. 2. *G. crinitum*.  
 Corolla with distinctly incurved tube and wide-campanulate throat; nutlets 4 (§ EUGOMPHOSTEMMA):—  
 Calyx-tube hirsute within, ribbed, green; ovary villous; nutlets hispid at apex:—  
 Corolla yellow; style hirsute; calyx-teeth longer than tube .. .. 3. *G. Scortechinii*.  
 Corolla white; style usually glabrous; calyx-teeth not longer than tube .. .. 4. *G. oblongum*.  
 Calyx-tube glabrous within, not ribbed, reddish; corolla white; nutlets quite glabrous, punctulate .. .. 5. *G. Curtisii*.

Sect. 1. STENOSTOMA, Prain. *Corolla-tube* straight, glabrous within, longer than the calyx, the limb narrow, the lips small. *Nutlets* usually solitary, smooth.

1. GOMPHOSTEMMA MICROCALYX, Prain Journ. As. Soc. Beng. LIX. ii. 316 (1890). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, sulcate, woody, hoary-pubescent or scabrid. *Leaves* opposite, herbaceous, dark-green above, hoary beneath, finely closely stellate-pubescent on both surfaces, oblong-ovate, acute; base cuneate, entire; margin elsewhere entire or widely and minutely toothed; 4·5 to 6 in. long, 3 to 3·5 in. wide; petiole of lower leaves 1·5 to 2 in., of upper leaves ·5 in. long, scabrid. *Flowers* in dense, few-flowered whorls in the axils of the lower leaves and on the bare stem below the leaves; bracts ovate-lanceolate, entire, ·25 in. long, ·12 in. wide. *Calyx* ·3 in. long; teeth short, triangular, less than half as long as the tube. *Corolla* yellow, 1·25 in. long, slightly puberulous externally; the throat very narrow. *Style* and ovary glabrous. *Nutlets* smooth, glabrous. Ann. Roy. Bot. Gard. Calc. III. 251.

PERAK: Larút, 1800 to 2000 ft. elev., *King's Collector* (Kunstler) 2155! *Scortechinii* 842! *Wray* 835! Ulu Bubong, *King's Collector* 10455!

Nearest to *G. parviflorum*, Wall., but with a much smaller calyx with diminutive teeth and a much narrower corolla. *G. parviflorum*, though stated by Bentham, Miquel, and Hooker to occur in Penang, has never been met with in our area. The specimens on which the statement is based were collected by Wallich, who in 1828 issued them as the types (Lith. Cat. n. 2159-1) of his own species *G. crinitum*, to which they most undoubtedly belong. A year later Wallich referred these same specimens (as n. 2158-c) to his own *G. parviflorum*; this quite erroneous afterthought has been accepted by the three authors referred to.

2. GOMPHOSTEMMA CRINITUM, Wall. Cat. 2159 (1828). A coarse perennial herb, 3 to 4 ft. high. *Stems* stout, erect, sulcate, woody,

hoary-pubescent or scabrid. *Leaves* opposite, herbaceous, dark-green, pubescent above, hoary beneath with a close stellate tomentum, or softly pubescent, elliptic-ovate or oblanceolate, acute; base cuneate, entire; margin elsewhere entire or serrate; 8 to 12 in. long, 2·5 to 5 in. wide; petiole ·5 to 1·5 in. long, scabrid. *Flowers* in rather lax, rarely condensed, many-flowered axillary cymes; bracts lanceolate, ovate-lanceolate or linear, ·5 to ·75 in. long. *Calyx* ·7 to ·75 in. long; teeth long, linear-subulate, considerably longer than the tube. *Corolla* yellow, 1·25 in. long, slightly puberulous externally; the throat narrow. *Style* and ovary glabrous. *Nutlets* smooth, glabrous.

*VAR. typica.* Bracts all lanceolate-acute or linear, almost as long as the calyx; leaves closely tomentose beneath; petioles 1·5 in. long. *G. crinitum*, Wall. Cat. (*uti supra*); Benth. in Wall. Pl. As. Rar. II. 12, in Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 552; Miq. Fl. Ind. Bat. II. 987; Hook. f. Fl. Br. Ind. IV. 698 (*partly*); Prain Ann. Roy. Bot. Gard. Calc. III. 254. *G. parviflorum*, Benth. Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 551; Miq. Fl. Ind. Bat. II. 987 (*not of Wall.*).

PENANG: Wallich 2159/1! PERAK: Kampong Kota, Wray! Sungei Ujong, Ridley 1870!—DISTRIB. Indo-China.

*VAR. Griffithii*, Prain Ann. Roy. Bot. Gard. Calc. III. 254. Outer bracts ovate-lanceolate obtuse, distinctly shorter than the calyx; leaves softly pubescent beneath; petioles ·5 in. long.

MALACCA: Mount Ophir and Chabu, Griffith 4042! PERAK: Gunong Ijok, Scortechini 5! Ulu Kwangsa, Scortechini 928!

Sect 2. EUGOMPHOSTEMMA, Prain. *Corolla-tube* incurved, glabrous within, longer than the calyx, the limb campanulate, the lips large. *Nutlets* usually 4, smooth or punctulate.

3. GOMPHOSTEMMA SCORTECHINII, Prain Journ. As. Soc. Beng. LIX. ii. 315 (1890). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, sulcate, woody, scabrid. *Leaves* opposite, herbaceous, dark-green, sparsely hirsute above, closely tomentose on the nerves, otherwise sparsely tomentose beneath, elliptic-oblong or obovate, acute; base rather long-cuneate; margin entire or serrate; 6 to 12 in. long, 3 to 6·5 in. wide; petiole usually short, sometimes obsolete, occasionally as much as 1 in. long. *Flowers* in many-flowered rather dense axillary whorls; bracts subulate, ·2 in. long, as long as the pedicels. *Calyx* ·75 in. long, prominently ribbed, hirsute within; teeth lanceolate, longer than the tube. *Corolla* yellow, 2·25 in. long, distinctly incurved, tomentose externally; limb ·35 in. wide. *Style* hirsute towards the apex, with spreading hairs; ovary densely villous. *Nutlets* white,

smooth, hispid towards the apex. Ann. Roy. Bot. Gard. Calc. III. 260.

PERAK: Gunong Tujok, *Scortechinii*!; Larút, *Kunstler* 1959!—  
DISTRIB. Indo-China.

Very closely related to *G. oblongum*, Wall., of which it appears to be the representative in the Malayan Peninsula. It extends northwards to Tenasserim, and its area thus to some extent overlaps that of *G. oblongum*.

4. GOMPHOSTEMMA OBLONGUM, Wall. Cat. 2154 (1828). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, woody, somewhat 4-angled, densely tomentose. *Leaves* opposite, herbaceous, dark-green, hispidly hairy above, densely pubescent beneath, elliptic-oblong, acute; base rather abruptly cuneate or subtruncate; margin crenate or crenate-serrate; 6 to 12 in. long, 2 to 3.5 in. wide; petiole .35 to 1 in. long, densely tomentose. *Flowers* in rather dense few-flowered axillary whorls; bracts ovate-lanceolate, .25 in. long. *Calyx* .5 in. long, prominently ribbed, hirsute within; teeth lanceolate, not longer than the tube. *Corolla* white, 1.75 in. long, distinctly incurved, tomentose externally except on the mid-lobe of the lower lip; limb .35 in. wide. *Style* glabrous or, when young, sparingly hirsute; ovary villous. *Nutlets* white, smooth, hispid at the apex. Benth. in Wall. Pl. As. Rar. II. 12, in Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 551 (*partly*); Miq. Fl. Ind. Bat. II. 986 (*partly*); Hook. f. Fl. Br. Ind. IV. 697; Prain Ann. Roy. Bot. Gard. Calc. III. 261.

ANDAMANS: Port Blair, not uncommon.—DISTRIB. Indo-China.

This species is very closely related to *G. Scortechinii*, from which it differs mainly in its rather smaller white flowers and its less hirsute or quite glabrous style. It has not yet been collected in any of the Malayan provinces, but having regard to the fact that *G. Scortechinii* extends northwards to Tenasserim, where *G. oblongum* is common, and thus invades the area in which *G. oblongum* occurs, it is not impossible that this species may yet be met with in the northern part of the Malayan Peninsula; it seems therefore advisable to give it a place in these *Materials*.

5. GOMPHOSTEMMA CURTISII, Prain Journ. As. Soc. Beng. LIX. ii. 315 (1890). A coarse perennial herb, 3 to 4 ft. high. *Stems* rather weak, flexuous, ascending, scabrid. *Leaves* opposite, the pairs rather remote, herbaceous, dark-green, hirsute above, adpressed-tomentose beneath, oblong-ovate, acute; base very shortly cuneate; margin denticulate; 3 to 5 in. long, 2 to 2.75 in. wide; petiole 1.25 to 4.5 in. long, adpressed-tomentose. *Flowers* in many-flowered lax axillary cymes; bracts narrow-ovate, long-acuminate, entire, reddish, .4 to .6 in. long. *Calyx* .5 in. long, smooth, glabrous within, reddish; teeth lanceolate-subulate from a short wide base, longer than the tube. *Corolla* white, 1 in. long, distinctly incurved, puberulous externally; limb .3 in.

wide. *Style* glabrous; ovary glabrous. *Nutlets* white, glabrous, punctulate. Ann. Roy. Bot. Gard. Calc. III. 266.

PENANG: *Curtis* 1310! PERAK: Larút, *Scortechini* 924! *Wray* 1233!

#### 18. CYMARIA, Benth.

Shrubs. *Flowers* small, in lax, many-flowered, peduncled, raceme-like cymes, all axillary, or the upper ones forming a terminal thyrsoid panicle. *Calyx* erect, 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed; the tube in fruit urceolate; the throat within naked or with a few setose hairs. *Corolla-tube* straight, exerted; limb 2-lipped; lower lip 3-lobed, spreading, the mid-lobe larger than the lateral; upper lip arched, erect. *Stamens* 4, ascending under the upper lip, didynamous, the upper pair shorter; anthers connivent, the cells divaricate. *Disk* equal, entire. *Style-arms* unequal, the upper very short. *Nutlets* subglobose or obovoid, rugosely pitted; hilum very large, lateral.—DISTRIB. Species 3, in Indo-China and Malaya.

CYMARIA DICHOTOMA, Benth. in Wall. Cat. 2080 (1828). A shrub, 2 to 3 ft. high. *Stems* and branches faintly 4-angled, finely pubescent. *Leaves* opposite, membranous, dark-green and almost glabrous except on the pubescent nerves above, paler, glandular, and closely grey-pubescent beneath, ovate or rhomboid, acute or subacute, rarely acuminate; base cuneate, decurrent on the petiole, entire; margin elsewhere distinctly to faintly crenate or sometimes subentire; 1·5 to 4 in. long, 1 to 2·25 in. wide; petiole ·25 to ·75, rarely 1 in. long, finely pubescent. *Flowers* in once, or sometimes twice, dichotomously branching cymes with terminal flowers and 6 to 12 secundly arranged flowers on each branch; the main peduncles ·5 to 1 in. long, finely pubescent; the flower-bearing branches ·6 to 1·5 in. long; bracts under branches spatulate-acute to lanceolate, ·1 to ·2 in. long; bracteoles subulate, ·05 in. long, finely pubescent. *Calyx* in flower campanulate, ·08 in. long, in fruit urceolate, ·15 in. long, glandular and pubescent, especially on the nerves externally, within sparingly beset with white setose hairs above the constriction; teeth 5, equal, triangular, as long as the portion of tube above the constriction; pedicels slender, finely pubescent, ·05 in. long. *Corolla* yellow, ·16 in. long, uniformly finely pubescent externally; tube distinctly exerted; lower lip spreading, 3-lobed, mid-lobe wide-oblong; upper lip erect, oblong; the apex notched. *Filaments* ascending under upper lip, included. *Nutlets* obovoid, ·03 in. long, wide-reticulate on back, the upper third glandular; the apex beset with very short white hairs. Benth. in Wall. Pl. As. Rar. I. 64, in Lab. Gen. & Sp. 705, and in DC. Prodr. XII. 603; Miq. Fl. Ind. Bat. II. 992; Hook. f. Fl. Br. Ind. IV. 705; Prain Journ. As. Soc. Beng. LXVI. ii. 522.

PERAK: on limestone hills, *Scortechini*! Ipoh Quarries, *Ridley* 9734! Marble Hill, Ipoh, *Fox* (*Ridley* 10686)!—DISTRIB. Burma.

The Perak specimens have rather more numerous flowered cymes than those from Burma, but are in other respects indistinguishable.

## Family XCII. PLANTAGINACEÆ.

[By 'D. PRIN.]

Annual or perennial scapigerous herbs. *Leaves* usually radical; scapes axillary. *Flowers* small, greenish, bracteate, often dimorphic, spicate. *Sepals* 4, imbricate in bud, persistent. *Corolla* scarious, hypogynous; lobes 4, short, imbricate in bud. *Stamens* 4, inserted on the corolla-tube or hypogynous; filaments filiform, persistent; anthers large, pendulous, versatile. *Ovary* superior, 1- to 4-celled; ovules in each cell 1 to 8. *Capsule* 1- to 4-celled, membranous: dehiscence circumscissile. *Seeds* 1 or more, usually attached by the centre; testa thin, mucilaginous; albumen fleshy; embryo cylindric, transverse; radicle inferior.—DISTRIB. Species under 100; cosmopolitan.

### PLANTAGO, Linn.

Annual or perennial herbs with a dense rosette of radical *leaves*. *Flowers* small, greenish, in dense spikes. *Sepals* 4, free, imbricate, persisting. *Corolla* 4-lobed, scarious; lobes short, imbricate. *Stamens* 4, adnate to corolla-tube; filaments filiform; anthers 2-celled, versatile. *Ovary* superior, 2- to 4-celled; ovules one or more in each cell. *Fruit* a small membranous capsule; dehiscence circumscissile. *Seeds* peltate, albuminous, mucilaginous.—DISTRIB. Species under 100, mainly in temperate regions.

PLANTAGO MAJOR, Linn. Sp. Pl. 112 (1753). A perennial herb with an erect stout rhizome. *Leaves* alternate, spirally disposed, all radical, sometimes sparsely pubescent, sometimes nearly glabrous on both sides, ovate or ovate-oblong, obtuse or subacute; base long-cuneate, tapering to and decurrent on the petiole; margin often irregularly and somewhat abruptly toothed; 3- to 7-, usually 5-nerved; 1 to 5 in. long, very variable in width; petiole often longer than the leaf-blade, broad and sheathing at the base. *Flowers* crowded or dispersed in slender rather lax spikes 2 to 6 in. long; bracts .05 to .08 in. long, broadly ovate-oblong, obtuse, with scarious margins. *Calyx* .12 in. long, glabrous; sepals oblong, obtuse or subacute, bluntly keeled externally,

margins widely scarious. *Corolla* .18 in. long, glabrous; lobes lanceolate-acute, reflexed. *Capsules* ovoid, .12 to .15 in. long, glabrous, dehiscing horizontally a little above the base, the upper portion separating as a conical lid tipped by the remains of the style. *Seeds* 4 to 8, angular, rugulose, dull, blackish, length .03 in. Dene. in DC. Prodr. XII. 696; Miq. Fl. Ind. Bat. II. 709; Hook. f. Fl. Br. Ind. IV. 705. *P. asiatica*, Linn. Sp. Pl. 163; Wall. Cat. 6412; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 423.

SINGAPORE: *Hullett*; *Kurz*. PENANG: *Walker*. MALACCA: *Griffith*. —DISTRIB. Almost cosmopolitan. In our area doubtless an introduced plant.

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#### ERRATA.

P. 642, line 20, for "4. CARDANTHERA, Voigt.," read "4. CARDANTHERA, Ham. MS." Line 7 from bottom, for "CARDANTHERA TRIFLORA, Voigt.," read "CARDANTHERA TRIFLORA, Ham. MS. in Voigt."

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*Materials for a Flora of the Malayan Peninsula.*—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., *late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.*

No. 21.

THIS Part contains two Families, No. 86 *Gesneraceæ* and No. 90 *Verbenaceæ*, and completes the account of the Gamopetalæ. The account of the *Gesneraceæ* was prepared by Mr. H. N. Ridley, F.R.S., Director of the Botanic Garden at Singapore, and was published in the 'Journal of the Straits Branch of the Royal Asiatic Society for 1905.' The material used by him was that of the Herbaria of Singapore and Penang, together with that belonging to the Royal Botanic Garden of Calcutta, and chiefly got together by collectors employed by Sir George King, lent to Mr. Ridley for the purpose. The account in the 'Straits Journal' not being quite in the form used in the 'Materials,' published under the auspices of the Asiatic Society of Bengal, has been edited by Mr. Gamble, with the kind help of Lt.-Col. Prain, of Kew, but he has been careful to make no more formal alterations than could be helped; so that the work is one for which Mr. Ridley alone is responsible. Only numbers personally verified or quoted by Mr. Ridley have been entered under the different species. Mr. Ridley, who has sanctioned what has been done, has himself furnished a few notes and additions, among them being descriptions of 3 new species, one of them the representative of a new genus. The number of species of *Gesneraceæ* herein described is 131, belonging to 20 genera, 1 genus and 2 species being new, besides 1 Sumatran species newly described.

The *Verbenaceæ* have been done by Mr. Gamble. It comprises 15 genera and 72 species, of which 16 species are new to science. Two Malay Islands species are also described.

In accordance with the Rules adopted at the Vienna Conference, Latin diagnoses are appended to the new genus and the 3 new species of *Gesneraceæ*, those for *Verbenaceæ* have been published in the Kew Bulletin.

#### Family LXXXVI.—GESNERACEÆ.

Herbs or shrubs, usually pubescent. *Leaves* opposite or apparently alternate, one of each pair being much reduced, simple entire or lobed. *Inflorescence* axillary, cymose or racemose or paniced; bracts small or large. *Calyx* of 5 sepals, often connate. *Corolla* tubular or campanulate, more or less distinctly bilabiate, 5-lobed; lobes oblong or rounded. *Stamens* 4 or 2, rudimentary or absent, didynamous when four; filaments linear or filiform, or short and thick; anthers linear or oblong, or scutiform, connivent in pairs, 2-celled; cells splitting on the inner face. *Disk* cylindric or annular or absent. *Ovary* cylindric or oblong; style slender, simple; stigma capitate, cordate or bilobed. *Fruit* a capsule, linear, cylindric, fusiform or oblong, splitting dorsally. *Seeds* very numerous, minute, plumed in epiphytic species, elliptic and not plumed in terrestrial species; or a fleshy berry (*Cyrtandra*).—DISTRIB. Species about 600, all tropical with a few in subtropical climates.

Seeds with one or more hairs from near hilum, and a single hair from apex; fruit dehiscent, a cylindric capsule:—

Stamens 4 perfect	..	..	..	..	1. <i>ÆSCHYNANTHUS</i> .
Stamens 2 perfect	..	..	..	..	2. <i>AGALMYLA</i> .

Seeds without hairs:—

Fruit dehiscent, a capsule, follicle or pyxidium:—

Capsules or follicles cylindric or rarely (*Loxocarpus*) conic:—

Corolla funnel-shaped:—

Stamens 4	..	..	..	..	3. <i>DIDISSANDRA</i> .
Stamens 2:—					

Capsule linear.

Stigma entire, ovate or capitate	..	..	4. <i>DIDYMOCARPUS</i> .
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Stigma 2-fid	..	..	5. <i>CHIRITA</i> .
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Capsule lanceolate or ovate	..	..	6. <i>TETRAPHYLLUM</i> .
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Corolla shortly campanulate:—

Stamens 2:—

Fruit a conic follicle	..	..	7. <i>LOXOCARPUS</i> .
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Fruit a cylindric capsule:—

Capsule straight	..	..	8. <i>PARABOEÆ</i> .
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Capsule twisted:—

Calyx 5-lobed	..	..	9. <i>BOEÆ</i> .
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Calyx 3-lobed .. ..	10. PHYLLOBOEA.
Stamens 4 .. ..	11. BOEICA.
Capsules or pyxidia ovoid or ellipsoid :—	
Stamens 2 :—	
Sepals free to the base :—	
Stem very short; calyx-lobes linear .. ..	12. ORCHADOCARPA.
Stem elongate; calyx-lobes ovate .. ..	13. LEPADANTHUS.
Sepals connate half-way up in a campanulate calyx ..	14. RHYNCOGLOSSUM.
Stamens 4 :—	
Fruit with dehiscence circumscissile .. ..	15. EPITHEMA.
Fruit splitting irregularly :—	
Herbs :—	
Leaf solitary; flowers minute .. ..	16. MONOPHYLLAEÁ.
Leaves several alternate; flowers large .. ..	17. STAURANTHERA.
Shrubs leafy :—	
Sepals free to the base; flowers small .. ..	18. RHYNCHOTECHUM.
Sepals connate in a tubular shortly lobed calyx; flowers large .. ..	19. CYRTANDROMOEÁ.
Fruit indehiscent, baccate; stamens 2 .. ..	20. CYRTANDRA.

# 1. ÆSCHYNANTHUS, Jack.

Epiphytes or rock-plants, with slender creeping or erect half-woody stems. *Leaves* opposite or whorled, fleshy or coriaceous, entire, ovate or lanceolate. *Flowers* large, usually showy, red yellow or green, in axillary or terminal heads, pedicelled. *Bracts* ovate or lanceolate, small. *Calyx* tubular or campanulate, subentire or more or less lobed, or sepals free to the base. *Corolla* tubular, curved, dilated above, shortly 2-lipped; upper lip of 2 lobes erect; lower of 3 lobes deflexed. *Stamens* 4 perfect, didynamous, usually exsert; anthers connivent in pairs; loculi oblong, parallel. *Ovary* superior, with a short cup-shaped disk at the base; style as long as stamens or shorter; stigma dilate or peltate. *Capsule* long-cylindric; base usually empty and narrower (gynophore), 2-valved loculicidally. *Seeds* innumerable, minute, oblong, rugose, with one or more hyaline scabrid hairs from near the hilum, and one from the apex.—DISTRIB. Species about 64, in India, Malaya and Hongkong; chiefly Malayan.

Seeds with a plume of hairs at one end, a single hair at the other (§ POLYTRICHUM); sepals free or very nearly so :—

Leaves pink beneath .. ..	1. Æ. Motleyi.
Leaves green, with transverse purple bars beneath .. ..	2. Æ. marmorata.

Seeds with a single hair at each end (§ HAPLOTURICHUM) :—

Sepals free or very nearly so :—	
Leaves in whorls of 4 or 5 .. ..	3. Æ. speciosa.
Leaves crowded towards the ends of the stems, opposite; sepals glabrous .. ..	4. Æ. stenophylla.
Leaves opposite in pairs :—	

- Corolla-tube 2-3 in. long:—  
 Sepals pubescent .. .. 5. *Æ. longiflora*.  
 Sepals glabrous .. .. 6. *Æ. perakensis*.  
 Corolla-tube under 1 in. long .. .. 7. *Æ. Hildebrandii*.  
 Sepals distinctly connate below:—  
 Calyx tubular, its mouth distinctly 5-lobed:—  
 Stems erect or pendent, not rooting at the nodes:—  
 Calyx 1 in. long, lobes under .5 in. long .. 8. *Æ. rhododendron*.  
 Calyx 1.25 in. long, lobes .5 in. long .. 9. *Æ. longicalyx*.  
 Stems creeping, rooting at the nodes:—  
 Leaves glabrous .. .. 10. *Æ. Lobbiana*.  
 Leaves pubescent .. .. 11. *Æ. radicans*.  
 Calyx cupular or campanulate, mouth entire or sub-  
 entire:—  
 Calyx green, cupular .. .. 12. *Æ. Wallichii*.  
 Calyx red, widely obconic .. .. 13. *Æ. obconica*.

1. *ÆSCHYNANTHUS MOTLEYI*, Clarke in DC. Monog. Phan. V. i. 20 (1883). Epiphytic woody plant; branches erect or pendulous, about 12 to 18 in. long. *Leaves* opposite, fleshy; lanceolate or ovate-lanceolate, acute; margins undulate or not; upper surface light green, lower pink; 3 to 4 in. long, .5 to 1.5 in. broad; petiole .25 in. long. *Flowers* solitary or few, axillary, pendulous; pedicels .25 in. long or less. *Calyx*-tube short, .125 in. long; lobes .75 to 1 in. long, glabrous, blackish-red. *Corolla*-tube .75 to 1.25 in. long, dilated upwards and at the base, light green; lobes rounded, sparingly hairy, the tips of the petals dark purple-brown. *Stamens* brown; filaments glabrous. *Ovary* oblong, with 5 glandular patches at base; style very short, cylindric; stigma capitate. *Capsule* cylindric, narrowed at the tip, 9 to 13 in. long. *Seed* .06 in. long, oblong, blunt, pustular; plume .5 in. long. Ridley in Journ. Linn. Soc. XXXII. 500, and in Journ. Str. Br. R. As. Soc. No. 43, 12.

PERAK: Larút Hills, Kurau and Batang Padang, Wray 245, 1475; *Scortechini*; Goping, Kinta, *King's Collector* 4463. PAHANG: Pulau Manis, Pahang River, *Ridley* 2151. JOHORE: Batu Pahat, *Ridley*. SINGAPORE: Chanchu Kang, *Ridley* 6244.—DISTRIB. Sumatra, Borneo, Celebes, Ceram.

2. *ÆSCHYNANTHUS MARMORATA*, T. Moore in Paxt. Fl. Gard. III. 56 (1852-53). An epiphyte, with erect woody stems about 12 in. high. *Leaves* fleshy, lanceolate, acute, narrowed at the base; light green on the upper surface with lighter variegations, dull green with transverse purple bars on the lower; petiole .25 in. long. *Flowers* solitary or few together, axillary; pedicels slender, .25 in. long. *Calyx*-tube very short (hardly any); lobes linear, pubescent, .35 to .4 in. long. *Corolla*-

tube a little over 1 in. long, dilated upwards, curved; lobes rounded, pubescent, green with brown bars in the mouth. *Stamens* 1·5 in. long; filaments hairy. *Style* hairy; stigma bilobed. *Capsule* 6 in. long, rather thick. *Seed* oblong, pustular; plume ·5 in. long. N. E. Brown in Gard. Chron. XVIII. 787 (1882); Clarke in DC. Monog. Phan. V. i. 38; Ridley in Journ. Linn. Soc. XXXII. 500, and in Journ. Str. Br. R. As. Soc. No. 43, 13. *Æ. zebrina*, Van Houtte Cat. (1851).

KEDAH: at Gunong Raya, Langkawi Islands, *Curtis* 2142. PENANG: Government Hill, *Curtis* 1700; *Ridley*.—DISTRIB. Burma (Mergui), Siam.

3. *ÆSCHYNANTHUS SPECIOSA*, Hook. Bot. Mag. t. 4320 (1847). A shrubby plant, with erect rather stout stems about 1 ft. high. *Leaves* fleshy, in whorls of 4 to 5, lanceolate, acute; margins smooth or undulate; 3 to 6 in. long, ·75 to 1·75 in. broad; petiole ·125 to ·25 in. long. *Flowers* large, showy, subterminal, clustered 10 or more together; bracts linear-lanceolate, hairy, ·25 in. long; pedicels slender, ·5 in. long. *Calyx*-lobes linear, free to the base, pubescent, ·5 in. long. *Corolla*-tube 3 in. long, narrow-cylindric at base, enlarged and curved above; lobes rounded, all pubescent. *Stamens* ·5 in. long, longer than the corolla-tube; filaments slender, slightly pubescent. *Style* stout, pubescent. Paxt. Mag. XIV. 199; Fl. des Serres Ser. I. t. 267; Miq. Fl. Ind. Bat. II. 718; Clarke in DC. Monog. Phan. V. i. 33; Ridley in Journ. Linn. Soc. XXXII. 499, and in Journ. Str. Br. R. As. Soc. No. 43, 14.

PERAK: Bruseh, near Bidor, *W. G. Napier*. SELANGOR: Bukit Hitam, *Kelsall*; Tomoh, *Machado*.—DISTRIB. Java, Sumatra (*Forbes* 2526), Borneo.

4. *ÆSCHYNANTHUS STENOPHYLLA*, Ridley, n. sp. *Stem* slender, 1 to 2 ft. long; internodes ·5 in. long. *Leaves* fleshy, glabrous, crowded towards the top of the stems; linear lanceolate, subacute, slightly narrowed at base; 2 in. long, ·25 in. broad. *Flowers* solitary in the axils of the leaves; pedicels very short, angular, glabrous, ·25 in. long. *Calyx*-lobes linear, acute, glabrous, ·125 in. long. *Corolla* (only one bud seen) small, pubescent. *Capsule* papery, linear, cylindric, 1 ft. long. *Disk* annular. *Seeds* with a single long white hair ·75 in. long.

PERAK: at Goping Kinta, at 500 to 800 ft. elevation, found growing on the hollow branch of a large tree, *King's Collector* 4738.—DISTRIB. Sumatra? (*Forbes* 2535).

[*ÆSCHYNANTHUS STENOPHYLLA*, Ridley, n. sp. *Caulis* gracilis, 30 ad 60 cm. longus, 1 ad 1·5 cm. intra nodos. *Folia* carnosae, glabra, versus apicem caulis congesta; lineari-lanceolata, subacuta, ad basin attenuata; 5 cm. longa, 6 mm. lata. *Flores* in axillis foliorum solitariae; pedicelli brevissimi, angulares, glabri, 6 mm. longi. *Calycis* lobi lineares, acuti, glabri, 3 mm. longi. *Corolla* parva, pubescens. *Capsula* chartacea,

linearis, cylindrica, 30 cm. longa; discus annularis. *Semina* pilo unico albo 2 cm. longo munita.

PENINSULA MALAYANA in Prov. Perak, circa 1500 ad 2500 m. alt.]

5. *ÆSCHYNANTHUS LONGIFLORA*, DC. Prodr. IX. 262 (1845). An erect woody plant, with stem over 1 ft. high. *Leaves* opposite, in distant pairs, fleshy; ovate, acuminate, shortly narrowed at base; 5 in. long by 2 in. wide; petiole .5 in. long. *Flowers* several, terminal, in a cluster; pedicels hairy, .5 in. long. *Calyx*-lobes narrowly linear, .5 in. long, puberulous, free nearly to the base. *Corolla*-tube scarlet, 3 in. long, cylindric at base, dilated above, hairy; lobes short, rounded. *Stamens* .75 in. longer than corolla-tube; filaments slender, pubescent. *Style* rather stout. *Capsule* cylindric, narrow, over 6 in. long. Hassk. Cat. Hort. Bogor. ed. 2, 154; Hook. Bot. Mag. t. 4328; De Vriese Pl. Ind. Bat. Reinw. 9; Fl. des Serres Ser. 1, t. 288; Paxt. Mag. XV. 25; Miq. Fl. Ind. Bat. II. 717; Clarke in DC. Monog. Phan. V. i. 32; Ridley in Journ. Linn. Soc. XXXII. 499, and in Journ. Str. Br. R. As. Soc. No. 43, 14. *Lysionotus longiflora*, Bl. Bijdr. 766.

PAHANG: on trees along the Tahan River, Ridley 2167.—DISTRIB. Java.

6. *ÆSCHYNANTHUS PERAKENSIS*, Ridley in Journ. Linn. Soc. XXXII. 449 (1895). A shrubby epiphyte, with stems about 2 ft. long. *Leaves* coriaceous; lanceolate, acuminate; 3 to 7 in. long, 1 to 2 in. wide; nerves inconspicuous. *Flowers* in a terminal fascicle, on pedicels nearly .5 in. long; bracts subulate, .125 in. long. *Calyx*-lobes linear, .25 in. long, glabrous, free to the base. *Corolla*-tube deep red, 2 to 2.5 in. long, narrow at the base, dilated and curved upwards, nearly glabrous; lobes rounded. *Stamens* .75 in. longer than corolla-tube; filaments glabrous or sparingly pubescent. *Capsule* more than 1 ft. long. *Seed* narrowly oblong, pustular, with a single hair at each end. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 15.

PERAK: in Larút Hills at 5500 ft., Ridley; Curtis 11447; King's Collector 2337, 7022; at Sungei Ryah, King's Collector 3641; at Thai-ping, King's Collector 8314.

7. *ÆSCHYNANTHUS HILDEBRANDII*, Hemsl. in Bot. Mag. t. 7365 (1894). A shrubby epiphyte; branches about 6 in. long, often rooting. *Leaves* fleshy, in distant pairs, glabrous, sessile; ovate, acute, base rounded; margins ciliate and with distant glands .5 in. long and broad. *Flowers* few, terminal at the ends of the branches; pedicels .25 in. long. *Calyx*-lobes free to the base, linear, acuminate, pubescent, .15 to .2 in. long. *Corolla*-tube thick, curved, little dilated, .75 in. long, glabrous, orange in colour; lobes short, red, rounded, pubescent. *Stamens* shortly exsert,



hairy. *Capsule* 6 in. long; base narrowed, sterile. Ridley in Journ. Linn. Soc. XXXII. 502, and Journ. Str. Br. R. As. Soc. No. 43, 15.

PERAK: Larút Hills, at 4500 ft., *Ridley*; at Gunong Ijuk, *Scortechini* 1187. PAHANG: Kluang Terbang and Gunong Benom, *Barnes*.—  
DISTRIB. Burma.

8. *ÆSCHYNANTHUS RHODODENDRON*, Ridley in Journ. Linn. Soc. XXXII. 500 (1895). An erect epiphytic shrub, 1 to 2 ft. high; stems stout, woody. *Leaves* opposite, in distant pairs, fleshy-coriaceous; ovate, acuminate; 2 in. long, 1·5 in. wide; nerves inconspicuous; keel prominent. *Flowers* several together, axillary and terminal; pedicels about ·5 in. long. *Calyx* tubular, deep purple, 1 in. long; lobes short, acute, glabrous. *Corolla* 3 in. long; tube thick, dilated above, glabrous; lobes oblong, rounded, ·5 in. long, pubescent, deep red with 3 black streaks on the lower lobes. *Stamens* very shortly exsert, little longer than the corolla, pubescent. *Capsule* cylindric, rather stout, 4 in. long; base narrowed into a gynophore. *Seeds* with a single hair at each end, brown, scabrid. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 15.

PERAK: Larút Hills at 2500 to 6000 ft. elevation, *Ridley*; *Curtis* 1311; *Scortechini* 58, 388; Plus River, *Scortechini* 468; *King's Collector* 2332.

9. *ÆSCHYNANTHUS LONGICALYX*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 16 (1905). *Stems* woody, over 1 ft. long. *Leaves* thick, fleshy, glabrous; ovate, acuminate; 2 to 3 in. long, 1 to 1·5 in. broad; midrib prominent; nerves obscure. *Flowers* large, terminal; pedicels ·5 in. long. *Calyx* elongate, tubular, glabrous, red, 1·25 in. long, with 5 long thin lanceolate acute lobes ·5 in. long. *Corolla* red with dark blotches in the mouth, 3 in. long, glabrous without; mouth pubescent; lobes rounded. *Stamens* nearly as long as corolla, pubescent. *Style* stout, pubescent; stigma capitate.

PERAK: *Scortechini* 36; at Gunong Batu Putih, *Wray* 1636. SELANGOR: Semangko Pass, *A. M. Burn-Murdoch*.

10. *ÆSCHYNANTHUS LOBBIANA*, Hook. Bot. Mag. t. 4260 (1846). A climbing epiphyte, with slender stems rooting along tree-trunks. *Leaves* in pairs, coriaceous, lanceolate or ovate-lanceolate, glabrous; 1·5 to 2 in. long, ·25 to ·75 in. broad; petioles short. *Flowers* in axillary and terminal fascicles 3 to 5 together; pedicels slender, ·75 in. long or less. *Calyx* tubular, 1 in. long, dark purple, thickly pubescent; lobes very short. *Corolla*-tube 2 in. long, thick, curved; lobes deep red, thickly pubescent, broad, rounded. *Stamens* barely exserted. *Capsule* 13 in. long, cylindric on a gynophore. *Seed* very small, oblong, pustular, with a hyaline mass at the hilum, and a single long white hair at each end. Fl. des Serres Ser. 1, t. 246; Miq. Fl. Ind. Bat. II. 721; Clarke in

Hook. f. Fl. Br. Ind. IV. 343, and in DC. Monog. Phan. V. i. 44; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 16.

KEDAH: at Gunong Jerai, *Ridley* 5513; at Gunong Raya, Langkawi, *Curtis* 2503. PENANG: on Government Hill, *Curtis*. PERAK: in Larút Hills to 5000 ft. alt., *Curtis*; *Wray* 873; *Scortechini* 36, 39, 330, 352. PAHANG: at Pekan, *Ridley*; at Kuautan, *Durnford*. SELANGOR: on Pahang track, *Ridley*. MALACCA: *Maingay* (K.D.) 1218, 1219; Mount Ophir and Ayer Panas, *Ridley* 1572. JOHORE: at Batu Pahat, *Ridley*; at Gunong Pulai, *G. King*; at Jambu Larang, *Fielding*. SINGAPORE: at Sungei Tengeh, *Ridley* 2710, at Kranji, *Ridley* 2706.—DISTRIB. Java, Sumatra, Borneo.

*King's Collector* No. 2636, from Larút, Perak, is a specimen with very fleshy leaves, but cannot yet be separated from *Æ. Lobbiana*, as there are in the series intermediates between it and the thin-leaved forms. It seems to occur only at high elevations.

11. *ÆSCHYNANTHUS RADICANS*, Jack in Trans. Linn. Soc. XIV. 43 (1823). An epiphytic plant growing on trees or rocks, the hairy stems creeping and rooting at the nodes, several feet long. *Leaves* hairy, shortly petioled; ovate, obtuse, broad at base; .5 to 1.25 in. long, .5 to .75 in. wide. *Flowers* axillary, 1 to 2 together; pedicels .5 in. long. *Calyx* tubular, hairy, deep red; lobes obtuse or subacute, .75 in. long. *Corolla* red, thick, curved, hairy; lobes subacute, glabrescent within. *Stamens* hardly exsert; filaments glabrous. *Capsule* cylindric, pubescent, acuminate, slender, 10 in. long. Calc. Journ. Nat. Hist. IV. 62; Spreng. Syst. II. 838; R. Br. in Benn. Pl. Jav. Rar. 115, and in Ann. Sc. Nat. 2, Vol. XIII. 160; DC. Prodr. IX. 202; De Vriese Pl. Ind. Bat. Reinw. 10; Miq. Fl. Ind. Bat. II. 720; Clarke in Hook. f. Fl. Br. Ind. IV. 343, and in DC. Monog. Phan. V. i. 41; Ridley in Journ. Linn. Soc. XXXII. 501, and in Journ. Str. Br. R. As. Soc. No. 43, 17. *Trichosporum radicans*, Nees in Flora (1825), 144; Blume Bijdr. 764.

PERAK: Bujong Malacca, *Ridley*; Sungei Rayah, *Scortechini* 37. TRINGGANU: Bundi, *Rostado*. MALACCA: *Griffith* (K.D.); *Cuming* 2387; Sungei Rambai, *Derry* 205; Sungei Ujong, *Cantley*.—DISTRIB. Sumatra, Java, Borneo.

VAR. *lanuginosa*, Ridley. *Calyx* green, densely white woolly, as is the outside of the corolla-tube.

PERAK: *Scortechini* 330.

12. *ÆSCHYNANTHUS WALLICHII*, R. Br. in Benn. Pl. Jav. Rar. 116 (1840). *Stems* rather slender, woody, glabrous. *Leaves* glabrous; lanceolate or elliptic, acuminate, narrowed at the base into the petiole; 3 in. long, 1 to 1.25 in. wide; petiole .25 in. long. *Flowers* few together,

subterminal; pedicel .25 in. long, slender. *Calyx* small, cupshaped, green, .25 in. long, hairy, almost entire. *Corolla* dark red, .75 in. long; tube stout; lobes rather large, rounded, hairy. *Stamens* included; filaments glabrous. *Capsule* 8 in. long, narrow, terete. Ann. Sc. Nat. 2. XIII. 160; Clarke in Hook. f. Fl. Br. Ind. IV. 343, and in DC. Monog. Phan. V. i. 48; Ridley in Journ. Linn. Soc. XXXII. 502, and in Journ. Str. Br. R. As. Soc. No. 43, 18. *Æ. radicans*, Wall. Cat. 798A (non Jack).

PERAK: Bujong Malacca, *Curtis*; Tapa, *Wray* 1417. MALACCA: Mount Ophir, *Lobb*, *Maingay* (K.D.) 1219. JOHORE: Tanjong Kopang, *Ridley*; Ulu Batu Pahat, *Kelsall*. SINGAPORE: *Wallich* 798A; Bukit Mandal, Chanchu Kang, Kranji, *Ridley*.—DISTRIB. Sumatra, Borneo.

13. *ÆSCHYNANTHUS OBCONICA*, Clarke in DC. Monog. Phan. V. i. 50 (1883). *Stems* about a foot long or more, woody, glabrous. *Leaves* in pairs, coriaceous, glabrous; elliptic oblong or ovate, acuminate, narrowed at base into the petiole; 1.5 to 3 in. long, .75 to 1.25 in. broad; petiole .25 in. long. *Flowers* subterminal, a few in a cluster; pedicels .25 in. long, hairy. *Calyx* deep red, obconic, wide, hairy, .25 in. long; mouth entire. *Corolla* .5 in. long; tube thick and short; lobes rounded, hairy, deep red with yellowish-white central bars. *Stamens* very shortly exsert; filaments nearly glabrous. *Capsule* 8 in. long, cylindric. Clarke in Hook. f. Fl. Br. Ind. IV. 343; Bot. Mag. t. 7336; Ridley in Journ. Linn. Soc. XXXII. 501, and in Journ. Str. Br. R. As. Soc. No. 43, 18.

PERAK: Batu Kuran and Bujong Malacca, *Curtis* 2990, 3335; Larút Hills, *Ridley* 2905; Blanja and Relan Tujor, *Wray* 149, 1772; *Scortechini* 28, 1861; Larút Peak at 2000 to 3000 ft., *King's Collector* 2012, 2849, 10179. DINDINGS: Pangkore, *Curtis* 1338. SELANGOR: Klang, *Beccari*.—DISTRIB. Borneo (*Motley* 687 fide *Hook. f.*).

The following Sumatran species is herein described.

*ÆSCHYNANTHUS FORBESII*, Ridley, nov. sp. An epiphytic shrub; stems creeping; branches slender, about a foot long. *Leaves* opposite, fleshy; ovate-lanceolate, acute; 2 to 2.5 in. long, .5 in. broad; midrib elevated, other nerves inconspicuous; petiole .2 in. long. *Flowers* subsolitary, axillary; pedicels .2 in. long. *Calyx*-lobes free to the base, extremely short, linear or acuminate, tips setiform, .2 in. long. *Corolla*-tube nearly .75 in. long, slightly curved and dilated upwards, pubescent, scarlet. *Style* hairy.

SUMATRA: Mount Dempo, 5700 ft., *Forbes* 2268. Rather remarkable for its very small calyx lobes.

[*ÆSCHYNANTHUS FORBESII*, Ridley, nov. sp. Frutex epiphyticus; caules reptantes, ramis 30 cm. longis gracilibus. *Folia* opposita, carnosa, ovato-lanceolata, acuta; 5–6 cm. longa, 10–15 mm. lata; præter costam elevatam nervis inconspicuis; petioli 5 mm. longi. Flores subsolitarii axillares; pedicelli 5 mm. longi. *Calycis* lobi ad basin liberi, brevissimi, lineares vel acuminati, 5 mm. longi, apicibus setiformibus. *Corollæ* tubus

ad 2 cm. longus, paullo curvatus et sursum dilatatus, pubescens, coccineus. *Stylus* pubescens.

SUMATRA : ad Montem Dempo 1700–1800 m. alt. calycis lobis minimis distincta.]

## 2. AGALMYLA, Blume.

Climbing epiphytic shrubs, with loose bark. *Leaves* alternate, long petioled, herbaceous, lanceolate or ovate-lanceolate. *Flowers* showy, scarlet, in compact axillary cymes. *Calyx* deeply 5-cleft; lobes narrow, acute. *Corolla* tubular, ventricose above, 2-lipped; lobes 5, ovate, obtuse. *Stamens* 2 perfect, long exsert; filaments slender; anthers connivent, imperfect; staminodes 2 to 3. *Disk* annular, thick. *Ovary* superior, linear, glabrous; style as long as or longer than the stamens; stigma 2-lipped. *Capsule* linear, long, 2-valved loculicidally. *Seeds* small, oblong, with a single hair at each end.—DISTRIB. Species 3, in the Malay Peninsula and Archipelago.

1. AGALMYLA STAMINEA, Blume Bijdr. 767 (1826). *Stems* very long, twining, hairy, at length glabrous. *Leaves* light green; elliptic-oblong, acuminate at both ends; lower surface strigose; 8 to 12 in. long, 3 to 4 in. broad; main nerves 8 to 10 pair; petiole 6 to 8 in. long, hairy. *Cymes* subsessile; bracts lanceolate; pedicels strigose. *Calyx* 5 in. long; lobes lanceolate, acute, pubescent, free nearly to base. *Corolla* 1 in. long, curved, dilated, scarlet, pubescent; lobes short, rounded. *Stamens* exsert for 1 in., glabrous; anthers oblong. *Style* stout, often very short, glabrous. *Capsule* 14 in. long, slender. R. Br. in Benn. Pl. Jav. Rar. 116, and in Ann. Sc. Nat. 2, XIII. 161; DC. Prodr. IX. 263; Hook. Ic. Pl. t. 733; De Vriese Pl. Ind. Bat. Reinw. 10; Hook. Bot. Mag. t. 5747; Fl. des Serres Ser. 1, t. 358; Miq. Fl. Ind. Bat. II. 722; Clarke in DC. Monog. Phan. V. i. 56; Ridley in Journ. Linn. Soc. XXXII. 502, and in Journ. Str. Br. R. As. Soc. No. 43, 19. *Justicia parasitica*, Lam. Ill. I. 42 (non Vahl). *Cyrtandra staminea*, Vahl Enum. I. 105.

PERAK: Larut Hills, Curtis 2042, and Ridley 2916; Maxwell's Hill, 3000 ft., Fox and Scortechini 295; Wray 2800; at 1000 to 3500 ft. King's Collector 2053, 2349, 2396, 6970.—DISTRIB. Java, Sumatra (Forbes 1864, 1948).

## 3. DIDISSANDRA, Clarke.

Shrublets or herbs, with short or tall stems, hairy. *Leaves* opposite, in remote pairs or crowded at the tip. *Flowers* solitary on subterminal peduncles or several on short axillary peduncles; bracts small, usually arrow. *Analys*-lobes 5, free to the base or nearly so, lanceolate or ovate. *Corolla* blue, white, pink or yellow, narrowly tubular, dilated upwards,

occasionally broadly tubular, infundibuliform; limb bilobed, usually unequally; lobes rounded. *Stamens* 4 perfect, in two pairs; filaments long, slender; anthers ovate or elliptic adhering by their faces; cells parallel, connective sometimes prolonged into a horn. *Disk* annular, small. *Ovary* cylindric, sessile; style as long or longer; stigma broad, ovate. *Capsule* cylindric, linear elongate, rarely short and thick, sessile, splitting along the upper edge, not twisted.—*DISTRIB.* Species about 20, in India, in the Malay Peninsula and Sumatra.

Stems tall; nodes distant; flowers several together in axillary clusters; leaves hairy above:—

- |                                 |    |    |    |                           |
|---------------------------------|----|----|----|---------------------------|
| Leaf-margins entire             | .. | .. | .. | 1. <i>D. johorica</i> .   |
| Leaf-margins minutely crenulate | .. | .. | .. | 2. <i>D. frutescens</i> . |

Stems short; leaves crowded at apex; flowers 1, rarely 2 or more, on subterminal peduncles:—

- |                                                        |    |    |    |  |
|--------------------------------------------------------|----|----|----|--|
| Leaves hairy above, their margins serrate or dentate:— |    |    |    |  |
| Capsule slender, cylindric:—                           | .. | .. | .. |  |

Sepals lanceolate acuminate, .25 in. long:—

- |                                    |    |    |    |                             |
|------------------------------------|----|----|----|-----------------------------|
| Leaves simply serrate              | .. | .. | .. | 3. <i>D. hirta</i> .        |
| Leaves doubly serrate              | .. | .. | .. | 4. <i>D. serratifolia</i> . |
| Sepals oblong-ovate, .125 in. long | .. | .. | .. | 5. <i>D. atrocyanea</i> .   |

- |                                |    |    |    |                           |
|--------------------------------|----|----|----|---------------------------|
| Capsule short, thick, fusiform | .. | .. | .. | 6. <i>D. latisejala</i> . |
|--------------------------------|----|----|----|---------------------------|

Leaves glabrous above:—

Leaf-margins entire, sinuate or obscurely crenulate:—

- |                                       |    |    |    |                             |
|---------------------------------------|----|----|----|-----------------------------|
| Flowers orange                        | .. | .. | .. | 7. <i>D. flammea</i> .      |
| Flowers violet-purple:—               | .. | .. | .. |                             |
| Corolla-tube slender, infundibuliform |    |    |    | 8. <i>D. violacea</i> .     |
| Corolla-tube wide, cylindric          | .. | .. | .. | 9. <i>D. atropurpurea</i> . |

Leaf-margins serrate, or dentate, or lobed:—

Sepals glabrous:—

- |                                                                      |    |    |    |                             |
|----------------------------------------------------------------------|----|----|----|-----------------------------|
| Leaves simply dentate; corolla white with violet markings, pubescent | .. | .. | .. | 10. <i>D. Wrayi</i> .       |
| Leaves runcinate; corolla lemon-yellow, glabrous                     |    |    |    | 11. <i>D. quercifolia</i> . |

Sepals more or less pubescent:—

- |                                                   |    |    |    |                             |
|---------------------------------------------------|----|----|----|-----------------------------|
| Leaves coarsely serrate; sepals linear lanceolate | .. | .. | .. | 12. <i>D. glabrescens</i> . |
| Leaves deeply lobed; sepals elliptic              | .. | .. | .. | 13. <i>D. filicina</i> .    |

1. *DIDISSANDRA JOHORICA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 22 (1905). Shrubby, 2 to 3 ft. high; stems pustular below, hairy above. *Leaves* alternate below, opposite above; lanceolate, acuminate, long-cuneate at base; margins entire; upper surface sprinkled with short conic hairs, lower shortly scabrid-hairy; 6 in. long, 1.25 in. broad; main nerves 6 to 7 pairs, ascending. *Cymes* axillary; peduncles slender, hairy, 1 in. long; bracts short, linear lanceolate; flowers 3 to 4 to each peduncle. *Calyx*-lobes small, linear lanceolate, acute, hairy.

*Corolla* pink. *Capsule* slender, cylindric, hispid, 1.5 in. long. *D. sp.*, Ridley in Journ. Linn. Soc. XXXII. 502.

JOHORE: at Gunong Panti, *Ridley* 4175.

2. *DIDISSANDRA FRUTESCENS*, Clarke in DC. Monog. Phan. V. i. 67, t. VII (1883). A shrub with woody stems, 3 to 4 ft. high; stems appressed hairy. *Leaves* opposite, in alternate pairs, distant; elliptic-lanceolate to oblanceolate, subacute at apex, cuneately narrowed at base; margins minutely crenulate; upper surface sprinkled with fine hairs, lower with appressed tawny silky hairs, especially on the nerves and reticulations; 7 to 9 in. long, 3 to 4 in. broad; main nerves about 12 to 20 pair; petiole 1.5 to 3 in. long, hairy. *Cymes* axillary, sessile, with short hairy branches 1 in. long; flowers 1 to 3 to each branch. *Calyx*-lobes red, hairy, narrow, lanceolate. *Corolla* white, 1.5 in. long; tube funnel-shaped, pubescent; lobes rounded. *Anthers* ovoid; filaments curved in the middle. *Ovary* glabrous; style pilose; stigma sub-bilobed. *Capsule* slender, cylindric, 3 in. long, glabrous, longitudinally ribbed. Clarke in Hook. f. Fl. Br. Ind. IV. 355; Ridley in Journ. Linn. Soc. XXXII. 502, and in Journ. Str. Br. R. As. Soc. No. 43, 21. *Didymocarpus frutescens*, Jack in Malay Misc. 1, part 2, 5, in Trans. Linn. Soc. XIV. 39, and in Calc. Journ. Nat. Hist. IV. 58 (1844); Wall. Cat. 780; R. Br. in Benn. Pl. Jav. Rar. 119, and in Ann. Sc. Nat. 2, XIII. 165; DC. Prodr. IX. 265; Miq. Fl. Ind. Bat. II. 726. *Henckelia frutescens*, Spreng. Syst., *curæ post.* 13.

PENANG: *Wallich* 780; *Curtis* 828; *Deschamps*. PERAK: at Tapa, *Wray* 826, at Waterfall Hill, *Wray* 1723; *Ridley* 2912; *Scortechini*; near Kinta River, *King's Collector* 837. DINDINGS: at Lumut, *Ridley* 7171. MALACCA: *Griffith* (K.D.) 3856; *Maingay* (K.D.) 1222.—DISTRIB. Sumatra.

3. *DIDISSANDRA HIRTA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 28 (1905). *Stem* woody, 3 in. long. *Leaves* oblanceolate, oblique, acuminate at apex, narrowed to the base; margins serrate; upper surface sprinkled with pale multicellular hairs, especially long on the marginal teeth; lower glabrous except on the midrib and nerves, which are covered with rather long multicellular hairs. *Scape* 3 to 4 in. long, hairy with catenulate multicellular hairs. *Calyx*-lobes .25 in. long, lanceolate, acuminate, very hairy. *Corolla* violet with a darker centre; tube 1 in. long, broad-cylindric, sprinkled with multicellular hairs; lobes large, rounded, .5 in. long, glabrous. *Stamens* 2 pairs, unequal. *Stigma* capitate.

PERAK: at Bujong Malacca, *Ridley*.

4. *DIDISSANDRA SERRATIFOLIA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 25 (1905.) *Stem* woody, 4 to 5 in. high, covered in the upper part with red hairs. *Leaves* opposite, oblanceolate, acuminate at apex,

long-cuneate at base; margins doubly serrate; upper surface sprinkled with pale multicellular hairs, lower glabrous except for the red multicellular hairs on the nerves and midrib; 6 to 10 in. long, 1·75 to 2·25 in. broad; main nerves 16 to 20 pairs; petiole 1 in. long or less, hairy. *Flowers* solitary on a slender hairy 4 in. long peduncle. *Calyx*-lobes lanceolate, acuminate, ·25 in. long; recurved, at length covered densely with red multicellular hairs. *Corolla* blue, 1·5 in. long; tube narrowed at the base, dilated upwards, broad, sparingly hairy; lobes rounded, the lower ones longer than the upper. *Stamens* in 2 subequal pairs, half as long as the corolla-tube; filaments attached close to the base, sinuate. *Style* stout; stigma capitate. *Capsule* 1·5 in. long, subcylindric, thick, ·125 in. broad, glabrous.

PERAK: at Bujong Malacca, *Ridley* 9779.

5. *DIDISSANDRA ATROCYNAEA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 26 (1905). *Stem* woody, about 6 in. high. *Leaves* crowded at the top of the stem, oblong or lanceolate-oblong, inæquilateral at the base; margins strongly serrate; black when dry; upper surface sprinkled with conical processes formed by the pushing in of the leaf from the under surface, each process bearing a short pale hair; lower surface punctate and marked with the mouths of the intrusions, glabrous except for the nerves and reticulations, which are covered with rufous hairs; 4 to 5 in. long, 1 to 2 in. broad; petiole winged to the base, covered with multicellular hairs. *Flowers* solitary on 3 in. long peduncles covered with red hairs. *Calyx*-lobes oblong ovate, glabrescent or with red hairs, ·125 in. long. *Corolla* deep purple with almost black mouth, nearly 2 in. long; tube shortly narrowed at base, broadly cylindric above, pubescent; lobes short, rounded, the lower lip the longer. *Stamens* 4; filaments slender. *Capsule* glabrous, cylindric, curved, 1 to 2 in. long.

PERAK: at Bujong Malacca, *Ridley*, *Curtis* 3298; *Scortechini* 368, 1896; at Gunong Batu Putih, *Wray* 310.

6. *DIDISSANDRA LATISEPALA*, *Ridley* in Journ. Linn. Soc. XXXII. 503 (1895). *Stem* short, woody. *Leaves* crowded at the top of the stem, oblong-ob lanceolate, unequal at base; margins crenate-dentate; surfaces sparingly hispid, red; midrib and nerves beneath covered with red hairs; 7 in. long, 2 in. broad; petiole 1 in. long. *Flowers* few on a 6 in. long hispid peduncle. *Calyx*-lobes ovate, ·125 in. long, glabrous. *Corolla* purple (?), 1 in. long, glabrous; tube cylindric, dilated upwards; lobes short, rounded. *Stamens* 4; filaments linear; anthers subglobose. *Ovary* glabrous; stigma clubbed. *Capsule* short, ·5 in. long, thick, fusiform. *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 26.

LEGEH: *Machado*.

7. *DIDISSANDRA FLAMMEA*, Ridley in Journ. Linn. Soc. XXXII. 503 (1895). *Stem* about 2 in. long, hardly woody, pubescent. *Leaves* oblong, obtuse, glabrous; upper surface shining; margins and nerves beneath hairy; 4 in. long, 1.25 in. wide; petiole short, pubescent. *Flowers* few, pendulous on an erect stout, purple, pubescent peduncle 3 in. long. *Calyx*-lobes narrowly lanceolate, acuminate, green with purple hairs, .5 in. long. *Corolla* orange red with darker red lobes; tube narrow at base, abruptly dilated, cylindric, hairy outside; lobes short, rounded, the lower ones a little longer. *Stamens* in 2 pairs; filaments slender, terete, hispid above, white; anthers globose. *Ovary* white, pubescent, straight; stigma clavate. *Disk* annular. *Capsule* short, cylindric, purple, 1.5 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 22.

LEGEH: gold mines north of Tringganu, *Machado*.

8. *DIDISSANDRA VIOLACEA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 23 (1905). *Stem* woody, about 6 in. high. *Leaves* tufted at the top of the stem, thin, oblanceolate, subfalcate, narrowed at the base into the petiole, acuminate at apex; margins sinuate; upper surface glabrous; midrib and petiole covered with red multicellular hairs; 4 to 7 in. long, 1 to 2 in. broad. *Flower*-peduncles numerous, erect, 2 to 3 in. long, sparingly red-hairy, 1-flowered; bracts linear-lanceolate, narrow, .25 to .5 in. long, closely appressed to the calyx. *Calyx*-lobes linear-lanceolate, glabrous, .25 to .5 in. long. *Corolla* violet, 1 to 1.5 in. long; tube rather narrow, gradually dilated upwards, sparingly pubescent; lobes unequal, the lower lip the longer. *Stamens* in 2 pairs, the longer pair scarcely one-fourth longer than the shorter. *Ovary* glabrous, rather short; stigma broad. *Capsule* 1.5 in. long, moderately thick, splitting along the upper edge.

PERAK: summit of Gunong Batu Patih, at 6700 ft., *Wray* 383; *Scortechini* 389.

This species comes near to *D. Wrayi*, but has smaller flowers.

9. *DIDISSANDRA ATROPURPUREA*, Ridley in Journ. Linn. Soc. XXXII. 504 (1895). *Stem* woody, 2 in. long. *Leaves* lanceolate or obovate, narrowed at the base, the bases unequal; margin obscurely crenate; upper surface glabrous, lower hairy on the raised nerves; 4 in. long, 1.5 in. broad; petiole 1 to 1.5 in. long. *Flowers* nearly sessile, in pairs on erect, glabrous, purple peduncles 3 to 5 in. long; bracts 2, ovate, .25 to .5 in. long, .125 in. wide, purple. *Calyx*-lobes nearly free to the base, lanceolate, acute, .25 to .35 in. long, glabrous. *Corolla* deep purple, 2 in. long, .5 in. broad, narrowed at the base, widely dilated



above; lobes short, rounded, the lower ones the longer. *Stamens* in 2 pairs; filaments straight; anthers oblong, appressed. *Style* thick, glabrous; stigma clavate. *Capsule* thick, 2 in. long, narrowed at the tip. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 23.

PERAK: on rocks at Hermitage Hill, *Ridley*; at Gunong Inas, *Scortechini* 1327.

*Wray* 3903, from Gunong Bubu, 5000 ft., "flowers mauve, five white stripes in tube," may be this or a new species near it, but the flowers are solitary on the peduncles.

10. *DIDISSANDRA WRAYI*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 24 (1905). *Stem* woody, bare below. *Leaves* alternate, lanceolate, oblique, acuminate at apex, narrowed at the base into the petiole; dentate on the margin; glabrous on the upper, whitish on the lower surface; 4 to 6 in. long, 1.5 to 2 in. broad; main nerves 16 pairs, raised on both surfaces; midrib and nerves beneath covered with coarse reddish trichomes; petiole .5 in. long, covered with rough multicellular trichomes. *Flowers* solitary, on 3 to 4 in. long slender peduncles from the upper axils, their bases covered with red multicellular hairs; bracts 2, ovate, broad, glabrous, appressed to the calyx, .25 in. long. *Calyx*-lobes broadly lanceolate, obtuse, glabrous, .5 in. long, white. *Corolla* white pencilled with violet, 1.25 to 1.5 in. long; tube thick, over .25 in. through; lobes broad, rounded. *Stamens* 4, didynamous; anthers rounded. *Style* short. *Capsule* slender, 1.5 to 2 in. long, glabrous.

PERAK: summit of Gunong Batu Putih, 6700 ft., *Wray* 334, 353; *King's Collector* 8036.

11. *DIDISSANDRA QUERCIFOLIA*, Ridley in Journ. Linn. Soc. XXXIII. 504 (1895). *Stem* woody, hairy, 6 in. long or less. *Leaves* crowded above, lanceolate-runcinate; base narrowed; upper surface deep green, glabrous; lower glaucous with the midrib and nerves covered with brown hairs; 2 to 8 in. long, 1 to 2 in. broad; petiole 1 in. long or less, hairy. *Flowers* large, 1 to 2 on 6 in. long sparsely hairy peduncles; bracts lanceolate, broad, hispid. *Calyx*-lobes broadly lanceolate, obtuse, green, glabrous. *Corolla* lemon-yellow, glabrous, 2 in. long; tube dilated, cylindric from a narrow base; lobes short, rounded. *Ovary* cylindric; stigma clavate. *Capsule* 3 in. long, glabrous, cylindric. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 26.

PERAK: Bukit Rengas, *Fox* 10683; Maxwell's Hill, 3000 ft., *Scortechini* 292, 300; *Curtis* 2041; *Ridley* 2910.

*King's Collector* 2171, from Larut Hills, 3000 to 3500 ft., seems to be this, but is much larger, the stem whitish corky, nearly 12 in. long, the peduncles up to 4-flowered.

12. *DIDISSANDRA GLABRESCENS*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 24 (1905). *Stem* woody. *Leaves* elliptic-lanceolate or oblanceolate; margins coarsely serrate; upper surface glabrous, lower dotted, glabrous except on the red hairy midrib and nerves; 4 to 7 in. long, 1 to 2.5 in. broad; petiole 1 in. long, hairy. *Flowers* solitary on 4 to 5 in. long hairy peduncles; bracts 1 to 2, lanceolate, oblong, .125 to .25 in. long. *Calyx*-lobes linear-lanceolate, obtuse, hairy, .25 to .5 in. long. *Corolla* mauve (Wray), deep blue (King's Collector), 1.5 in. long; tube gradually dilated upwards; lobes rounded, pubescent. *Anthers* subglobose. *Stigma* capitate, broad. *Capsule* 1.5 to 2.5 in. long, cylindric, slender.

PERAK: summit of Gunong Batu Putih, 6700 ft., Wray 384; do., 2000 to 3000 ft., King's Collector 8055; Kinta at 3000 to 3500 ft., King's Collector 7191.

13. *DIDISSANDRA FILICINA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 27 (1905). *Stem* woody, pale, rather slender. *Leaves* lanceolate, deeply lobed with oblong rounded lobes about 13 on each side; glabrous above, paler beneath, with red appressed hairs on the midrib; 3 to 5 in. long, 1 to 1.5 in. broad; petiole .5 in. long with red appressed hairs. *Flower* 1 on a slender, red, hairy peduncle 1.5 in. long; bracts very small, ovate, about .1 in. long; pedicel .25 in. long. *Calyx*-lobes elliptic, rounded, dark red, sparingly hairy, .1 to .2 in. long. *Corolla* 1.5 in. long; tube with narrow base, dilated upwards, trumpet-shaped, sparingly pubescent at the base, purple, paler below outside, inside dark purple, with 6 white lines down the base; lower lip longer than the upper; lobes rounded. *Stamens* 4, in 2 pairs, the connective prolonged in a triangular horizontal horn. *Disk* annular. *Capsule* sub-follicular, 1.5 in. long, glabrous.

PERAK: at Gunong Chabang, on rocks overhanging a creek, *Scortechini* 14.

#### 4. *DIDYMOCARPUS*, Wall.

Herbs or usually small shrubs; stems simple or branched, erect or prostrate. *Leaves* herbaceous, opposite or the alternate ones reduced, seldom wanting, ovate or lanceolate, usually pubescent or hairy, petioled. *Peduncles* axillary, bearing one or more flowers in a cyme. *Calyx*-lobes 5, short, free to the base or nearly so. *Corolla* infundibuliform, bilabiate; lobes equal or the lower ones longer than the upper. *Stamens* 2 complete; filaments filiform, rising from about half-way down the tube; anthers reniform, connivent by the edges; staminodes 2, short, hooked. *Ovary* cylindric, passing into the style; stigma capitate or ovate, entire. *Disk* annular or absent. *Capsule* cylindric,

narrow, usually splitting along the upper edge. Seeds numerous, minute, ellipsoid, not plumed.—DISTRIB. Species about one hundred, in India and Malaya.

Sect. I. ELATÆ :—

- |                                                                                             |                              |
|---------------------------------------------------------------------------------------------|------------------------------|
| Stem tall, branched, shrubby; leaves in distant pairs,<br>unequal; bract 1, cupshaped .. .. | 1. <i>D. corchorifolia</i> . |
| Stem long and weak; bracts 2, ovate .. ..                                                   | 2. <i>D. sulphurea</i> .     |
| Stem weak :—                                                                                |                              |
| Bracts ovate, amplexicaul; flowers yellow .. ..                                             | 3. <i>D. citrina</i> .       |
| Bracts oblong, glabrous; flowers claret colour .. ..                                        | 4. <i>D. purpurea</i> .      |

Sect. II. DIDYMANTHUS :—

- |                                                                                                  |                               |
|--------------------------------------------------------------------------------------------------|-------------------------------|
| Stem erect, herbaceous; leaves in distant pairs :—                                               |                               |
| Flowers very small, .25 in. long, axillary .. ..                                                 | 5. <i>D. parviflora</i> .     |
| Flowers medium-sized :—                                                                          |                               |
| Flowers yellow :—                                                                                |                               |
| Leaves lanceolate acute .. ..                                                                    | 6. <i>D. flava</i> .          |
| Leaves ovate acuminate .. ..                                                                     | 7. <i>D. ramosa</i> .         |
| Leaves unequal, narrowly lanceolate .. ..                                                        | 8. <i>D. flavescens</i> .     |
| Flowers white :—                                                                                 |                               |
| Leaves opposite, equal, hairy, ovate :—                                                          |                               |
| Edges pubescent .. ..                                                                            | 9. <i>D. hispida</i> .        |
| Edges conspicuously red-hairy .. ..                                                              | 10. <i>D. hirta</i> .         |
| Leaves lanceolate, thinly pubescent .. ..                                                        | 11. <i>D. viscida</i> .       |
| Leaves subglabrous, equal, long-petioled .. ..                                                   | 12. <i>D. albina</i> .        |
| Leaves glabrous, unequal :—                                                                      |                               |
| Flowers solitary, on short peduncles .. ..                                                       | 13. <i>D. alternans</i> .     |
| Flowers in pairs on long peduncles from upper<br>axils .. ..                                     | 14. <i>D. glabrata</i> .      |
| Stem erect, herbaceous, little-branched; flowers yellow;<br>corolla cylindric, trumpet-shaped :— |                               |
| Leaves petioled, silky, in distant pairs :—                                                      |                               |
| Corolla 2 in. long .. ..                                                                         | 15. <i>D. malayana</i> .      |
| Corolla 1 in. long .. ..                                                                         | 16. <i>D. albomarginata</i> . |
| Leaves crowded above, hairy :—                                                                   |                               |
| Stem slender; flowers small, congested .. ..                                                     | 17. <i>D. flavobrunnea</i> .  |
| Stem woody :—                                                                                    |                               |
| Leaves glabrous, congested at the top, not petioled;<br>flowers yellow .. ..                     | 18. <i>D. longipes</i> .      |
| Leaves alternate lanceolate, inæquilateral; flowers<br>blue .. ..                                | 19. <i>D. inæqualis</i> .     |
| Leaves crowded or distant, elliptic, petioled;<br>flowers white .. ..                            | 20. <i>D. alba</i> .          |

Sect. III. REPTANTES. Prostrate or creeping herbs. Leaves  
in distant pairs, equal or unequal, hairy or pubescent :—

- |                                                                                  |                         |
|----------------------------------------------------------------------------------|-------------------------|
| Flowers blue or white, sometimes with yellow streaks :—                          |                         |
| Leaves hairy, rarely glabrous; flower in uppermost<br>axil, peduncle short .. .. | 21. <i>D. reptans</i> . |

Leaves velvety, elliptic :—

Flowers solitary, terminal .. .. 22. *D. ophirensis*.

Flowers numerous, on slender pedicels .. .. 23. *D. pulchella*.

Flowers orange-yellow :—

Calyx-lobes hairy .. .. 24. *D. crocea*.

Calyx-lobes narrow, subglabrous .. .. 25. *D. ascendens*.

Sect. IV. *HETEROBÆA*. Stems woody, usually short, with the leaves crowded towards the top, more or less hairy above, and little or not branched. Leaves hairy, silky or rarely glabrous, lanceolate, serrate, narrowed at the base into a winged petiole, alternate. Peduncles slender, axillary in the upper axils, 1- rarely 2-flowered. Bracts usually small, solitary, linear. Corolla large, showy; white crimson or blue, rarely yellow; filaments long, slender. Capsule narrow, cylindric :—

Flowers solitary, bracts very small :—

Leaves glabrous, wrinkled .. .. 26. *D. rugosa*.

Leaves tessellate, not wrinkled, obovate, glabrous or with scattered hairs with swollen bases :—

Capsule over 2 in. long .. .. 27. *D. platypus*.

Capsule shorter, 1 in. long .. .. 28. *D. Kompsobæa*.

Leaves not tessellate, hairy or pubescent.

Leaves broad, covered with close short hairs :—

Flowers white, tipped with crimson .. .. 29. *D. quinquevulnera*.

Flowers deep crimson .. .. 30. *D. atrosanguinea*.

Leaves narrow, lanceolate, densely hairy, distant;

flowers yellow .. .. 31. *D. hirsuta*.

Leaves silky pubescent on both surfaces; flowers

white, tinged with pink or blue .. .. 32. *D. bombycina*.

Leaves crowded, thickly appressed, hairy; flowers

white or blue .. .. 33. *D. crinita*.

Leaves crowded, covered with short scattered hairs

above, deep green with central white bar; flowers

white .. .. 34. *D. fasciata*.

Flowers in pairs on a long peduncle; bracts very broad 35. *D. venusta*.

Sect. V. *SALICINÆ*. Small shrubby plants with narrow

leaves crowded at top. Flowers small :—

Leaves entire .. .. 36. *D. densifolia*.

Leaves serrate :—

Flowers 125 in. long, pink .. .. 37. *D. salicina*.

Flowers 75 in. long, white with purple outside, yellow

in mouth .. .. 38. *D. serratifolia*.

Leaves deeply cut, pinnate .. .. 39. *D. pectinata*.

Sect. VI. *ACAULES*. Stemless or nearly so; leaves crowded :—

Flowers panicled, lips very unequal .. .. 40. *D. violacea*.

Flowers 1- 2-racemose :—

Flowers large, blue .. .. 41. *D. lacunosa*.

Flowers small :—

Leaves elliptic, peltate .. .. 42. *D. perdita*.

Leaves obovate, crenulate :—

Capsule very short and broad .. .. 43. *D. puncticulata*.

Capsule linear, narrow .. .. 44. *D. heterophylla*.

Leaves small, entire, silky .. .. 45. *D. pumila*.

*Affinity doubtful.*

Stem tall; leaves alternate, distant. Panicles small,

adnate to petioles .. .. 46. *D. lilacina*.

# Sect. I. ELATÆ.

1. DIDYMOCARPUS CORCHORIFOLIA, R. Br. in Benn. Pl. Jav. Rar. 119 (1840). A shrub, 4 to 6 ft. high, much branched, with a stout woody stem. *Leaves* opposite but unequal, ovate, subacute, inæquilateral, rounded at base; margins serrate; both surfaces, but especially the under, covered with soft, short, felted hair; 3 to 9 in. long, 1·5 to 5 in. broad; petiole 1 to 3 in. long. *Panicles* lax, axillary, 2 to 3 in. long; peduncles short, pubescent; flowers numerous; bracts cupshaped. *Calyx* cupshaped, ·25 in. long, shortly 5-toothed. *Corolla* ·75 in. long, white applegreen in the throat or often purplish-white; tube straight, thick; lobes rounded, the upper lip recurved, the base appressed to the broad decurved lower lip which is much longer. *Capsule* cylindric, 1 to 2·5 in. long, pubescent, splitting to near the tip. Ann. Sc. Nat. 2, XIII. 164; Wall. Cat. 792; DC. Prodr. IX. 265; Miq. Fl. Ind. Bat. II. 726; Clarke in DC. Monog. Phan. V. i. 85, and in Hook. f. Fl. Br. Ind. IV. 351; Ridley in Journ. Bot. XXVIII. 68 (1890), and in Journ. Str. Br. R. As. Soc. No. 43, 31.

PENANG: *Wallich* 792; Government Hill, *Curtis* 1239; *Maingay* (K.D.) 1227. SELANGOR: Pahang track and Semangko, *Ridley* 8553. PERAK: Bujong Malacca, *Ridley* 9775, *Curtis* 3130; Gunong Hijau, *Scortechini* 1266; Kinta, at 1500 to 2000 ft., *King's Collector* 7220; 2000 to 3000 ft., *King's Collector* 10979, 10998.

2. DIDYMOCARPUS SULPHUREA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 32 (1905). A shrubby creeper 6 to 10 ft. long; stem pubescent, branched, with long internodes. *Leaves* opposite but very unequal, one up to 3 in. long by ·75 to 1·75 in. broad, the opposite one ·5 to ·75 in. long, ·15 to ·25 in. wide; ovate or lanceolate, acute; base unequal, cuneate; margins crenulate dentate; deep green above, purple beneath; nerves 6 to 7 pairs elevated on both surfaces, sprinkled all over on both surfaces with short hairs, more hairy on the back. *Peduncles* axillary, filiform, 4 to 6 in. long, pubescent; branches at the top 2 or 3, each bearing as many flowers; bracts 2 to each pair of flowers, ovate, glabrous, ·125 in. long. *Calyx*-lobes elliptic-ovate, obtuse, glabrous. *Corolla* infundibuliform, ·5 in. long, glabrous; upper lip short recurved, lower one longer. *Stamens* shortly exsert; filaments thick, pubescent.

*Style* stout; stigma excavate at the top. *Capsule* 1·5 to 3 in. long, rather thick, cylindric, acuminate, glabrous.

PERAK: Gunong Hijau, Gunong Chabang and Gunong Bubu, *Scortechini* 6; Gunong Batu Patih, at 3000 to 4000 ft., *King's Collector* 8059; do. 4500 ft., *Wray* 219; Bujong Malacca, *Ridley* 9774.

VAR. *breviflora*, *Ridley* l.c. Bracts and calyx-lobes narrower, acute, pubescent. *Corolla* smaller, ·25 to ·5 in. long. *Capsule* pubescent, ·75 in. long.

SELANGOR: Bukit Kutu, *Ridley* 7582.

3. *DIDYMOCARPUS CITRINA*, *Ridley* in Journ. Linn. Soc. XXXII. 508 (1895). A soft weak herb, about 1 ft. high, pubescent. *Leaves* soft, opposite but unequal, the larger 2 to 3 in. long, 1·25 in. wide; ovate or ovate-lanceolate; velvety; margins crenulate; petiole ·5 to 3 in. long. *Panicles* axillary, 3 in. long, pubescent at base, glabrate above; bracts ovate cordate, acute, nearly amplexicaul, polished green with red edges; pedicels ·5 to 1 in. long, terete, glabrous. *Calyx*-lobes triangular, spreading, stiff, green, edges red. *Corolla* lemon-yellow, pendulous; tube 1 in. long, funnel-shaped, base narrowed, mouth dilate, ·5 in. across; upper lobes broad, rounded, recurved. lower ones larger. *Stamens* 2; filaments short, sinuate, pubescent; anthers subtriangular. *Ovary* and style ·5 in. long, pubescent; stigma peltate. *Disk* cylindric. *Capsule* 1 in. long, angled, glabrous. Journ. Str. Br. R. As. Soc. No. 43, 32.

KEDAH: Gunong Jereh, at 2000 ft. alt., *Ridley* 5518.

4. *DIDYMOCARPUS PURPUREA*, *Ridley* in Journ. Linn. Soc. XXXII. 508 (1895). *Stem* herbaceous, 12 to 18 in. high. *Leaves* ovate, acute, inæquilateral, velvety; 4 in. long, 2 in. broad; margins crenulate; petiole ·25 to ·5 in. long. *Panicle* erect, subterminal, 4 in. long, with slender branches; peduncle 3 in. long, glabrous; bracts small, ovate. *Calyx*-lobes spreading, oblong, glabrous, short. *Corolla* tubular, purple; tube narrowed at base; lobes rounded, lower ones longer. *Stamens* 2; filaments filiform, included; staminodes filiform. *Ovary* cylindric; stigma broad, discoid. *Capsule* ·5 in. long, cylindric, glabrous, stipitate. Journ. Str. Br. R. As. Soc. No. 43, 33.

KEDAH: Lankawi Island on Gunong Chinchau, 1000 to 1500 ft., *Curtis* 2567.

## Sect. II. DIDYMANTHUS.

5. *DIDYMOCARPUS PARVIFLORA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 33 (1905). A small erect herb about 1 ft. high or less, much branched; stem slender, covered with appressed hairs. *Leaves* opposite, equal; lanceolate, acute; 1 in. long, ·25 in. broad; glabrous and puncticulate on the upper surface, on the lower yellow pustular and

with short translucent hairs which are longer and multicellular along the margin, midrib and nerves; nerves 5 pairs; petiole .25 in. long, hairy. *Flowers* solitary, axillary on slender hairy peduncles .25 in. long. *Calyx*-lobes linear, obtuse, pubescent. *Corolla* .25 in. long, yellow-pubescent; tube broad, straight; lobes short, broad, rounded. *Stamens* nearly as long as corolla-lobes; anthers large, white, reniform; filaments glabrous. *Ovary* as long as stamens, pubescent; stigma capitate, entire. *Capsule* slender, pubescent.

NEGRI SEMBILAN: at Gunong Angsi, *Ridley*.

6. *DIDYMOCARPUS FLAVA*, *Ridley* in Journ. Linn. Soc. XXXII. 507 (1895). *Stem* 1 ft. tall, scabrid, branched. *Leaves* lanceolate acute, base narrowed; denticulate on the margins; scabrid beneath, covered on the nerves with short hairs; 3 in. long, 1.5 in. broad; petiole .5 in. long. *Cymes* axillary and subterminal, on hairy peduncles 1 to 2 in. long; pedicels .5 in. long; flowers 4 or 5. *Calyx* short; lobes hispid lanceolate. *Corolla* glabrescent, yellow, .75 in. long; tube straight, dilated upwards; lobes short, obtuse. *Style* slender, pubescent. *Capsule* cylindric, 1.5 in. long, hispid. *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 34.

PERAK: Larut Hills, *Ridley* 2914; *Curtis* 2690; at 2500 to 3000 ft., *King's Collector* 2151; *Scortechini* 563.

VAR. *purpurascens*, *Ridley*. *Stems* stouter, over 1 ft. high, hairy. *Leaves* opposite, equal, obliquely ovate acute, often purple as is the stem.

PERAK: Bukit Kapayung, Sungei Siput, *Ridley*.

7. *DIDYMOCARPUS RAMOSA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 34 (1905). *Stem* slender, branched, pubescent with appressed hairs, over 1 ft. tall. *Leaves* distant, opposite, but one of each pair much smaller; ovate acuminate, thin, rounded or slightly narrowed at the base; glabrous above, sparingly hairy on the nerves beneath; nerves about 7 pairs; 2 to 3 in. long, 1.5 in. wide or smaller; petiole .125 in. long. *Peduncles* slender, from the lower axils, 1.25 in. long, 2-flowered, viscid hairy. *Calyx*-lobes lanceolate acuminate, viscid hairy, .125 in. long. *Corolla*-tube straight, hardly dilated, .5 in. long, greenish yellow, bilabiate; lower lobe longer than upper; lobes rounded. *Stamens* 2; filaments long filiform; anthers oblong. *Ovary* long-cylindric; style long, slender; stigma capitate, small.

PERAK: Gunong Batu Putih, *Wray* 868.

8. *DIDYMOCARPUS FLAVESCENS*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 35 (1905). *Stems* slender, over 1 ft. long, covered with short appressed hairs. *Leaves* distant, opposite but unequal; lanceolate, acuminate at both ends, entire; sprinkled over on both surfaces with

short scattered hairs; 1·5 to 2 in. long, ·5 in. wide; petiole ·15 to ·2 in. long, silky-hairy. *Peduncles* 1-flowered, slender, subterminal, 1 in. long, pubescent. *Calyx*-lobes linear, hairy. *Corolla* yellowish-white, ·5 in. long, pubescent; tube straight, cylindric, hardly dilated above; bilabiate; lobes short, rounded. *Stamens* 2; filaments filiform. *Ovary* short, cylindric; style short, pubescent; stigma capitate.

SELANGOR: Kwala Kubu, *Ridley* 7585.

9. *DIDYMOCARPUS HISPIDA*, *Ridley* in *Journ. Linn. Soc.* XXXII. 507. (1895). *Stem* 6 to 12 in. tall, hispid. *Leaves* opposite, equal; ovate or lanceolate, acute or acuminate at both ends; 3 to 5 in. long, 1 to 2 in. wide; scabrid on the upper surface, hairy on the lower, especially on the nerves; petiole 1 in. long. *Peduncles* 1 to 3, erect from the upper axils, 3 in. long, hairy, with 3 or 4 terminal branches, bearing a few flowers; pedicels hispid, ·5 in. long; bracts linear, ·25 in. long. *Calyx* ·25 in. long; lobes lanceolate, hairy. *Corolla* glabrous, 1 in. long, white with violet streaks in the lower lip; tube straight, funnel-shaped; upper lobes ovate subacute, lower ones longer. *Stamens* 2; filaments slender, nearly straight, filiform; staminodes short, clubbed, 2. *Ovary* fusiform, pubescent; style terete; stigma capitate. *Capsule* 1·5 in. long, straight, cylindric. *D. hispidula*, *Ridley* in *Journ. Str. Br. R. As. Soc.* No. 43, 35.

PERAK: Larut Hills at 4000 to 6000 ft., *Curtis* 1312, 2037; *Ridley*; *King's Collector*; *Scortechini* 467?

VAR. ? *selangorensis*, *Ridley*. *Leaves* shorter, glabrous above. *Calyx*-lobes longer. *Capsule* 3 in. long, softly velvety.

SELANGOR: Gunong Semangko, *Curtis* 3752.

10. *DIDYMOCARPUS HIRTA*, *Ridley* in *Journ. Str. Br. R. As. Soc.* No. 43, 36 (1905). *Stem* herbaceous, branched, about 1 ft. tall, thickly covered with rather long reddish multicellular hairs. *Leaves* opposite; ovate or ovate-lanceolate, subacute, narrowed at the base; 3 in. long, 1 to 1·5 in. wide; margin serrulate, hairy; rather densely hairy on the upper surface with multicellular hairs; on the lower surface, midrib, and nerves covered with close long pale hairs; petiole ·25 in. long, hairy. *Peduncles* subterminal, 2·5 in. long, very hairy, red; bract very small, linear; flowers solitary on the peduncles. *Calyx*-lobes linear, narrow, hairy, ·15 to ·2 in. long. *Corolla* absent. *Capsule* 2 in. long, cylindric, closely but very shortly hairy. *Ovary* cylindric; style long, pubescent; stigma discoid.

SELANGOR: above the gap, Semangko Pass, *Curtis*.

11. *DIDYMOCARPUS VISCIDA*, *Ridley* in *Journ. Str. Br. R. As. Soc.* No. 43, 36 (1905). *Stems* slender, 6 in. long or more; shortly roughly hairy. *Leaves* opposite, thin; lanceolate or ovate-lanceolate, acuminate; base inæquilateral; upper surface sparingly scabrid hairy, lower hairy on



the nerves; 3 to 4 in. long, 1 to 1.5 in. broad; main nerves about 6 pairs; petiole .5 in. long, roughly hairy. *Peduncle* subterminal, 2 in. long, viscid hairy; cyme-branches 1 in. long. *Calyx*-lobes very short, lanceolate, viscid hairy. *Corolla* rather over .5 in. long; tube swollen at base, then funnel-shaped, white, sparingly pubescent. *Stamens* 2, included; filaments filiform. *Style* shorter than stamens. *Capsule* slender, cylindric, acuminate, viscid hairy, 1 in. long.

PERAK: Gunong Keledang, *Ridley* 9781.

12. *DIDYMOCARPUS ALBINA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 37 (1905). *Stem* 2 to 3 ft. tall, herbaceous, appressed hairy. *Leaves* opposite, equal; lanceolate or ovate-lanceolate, acuminate at base and apex; margins shortly serrate; 4 to 6 in. long by 1.5 to 2 in. wide; glabrous except the midrib on the back, which is covered with appressed hairs; petiole appressed hairy, 1.5 in. long. *Peduncle* axillary, 3 in. long, with a lax few-branched terminal panicle 1 in. long; bracts and bracteoles linear. *Calyx*-lobes lanceolate acuminate, .1 in. long. *Corolla* .5 in. long, waxy white, slightly pubescent; tube cylindric; limb distinctly bilobed. *Stamens* 2; filaments glabrous; anthers ovate-lanceolate. *Ovary* and style pubescent.

PERAK: Gunong Batu Putih, at 3000 to 4000 ft., *King's Collector* 8070.

This is allied to *D. hispida*, *Ridl.*, but with nearly glabrous and more lanceolate leaves and smaller flowers.

13. *DIDYMOCARPUS ALTERNANS*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 37 (1905). *Stem* about 1 ft. tall, erect, scabrid hairy above, rather slender. *Leaves* thin; subalternate or opposite; lanceolate acuminate; base inæquilateral cuneate; entire or slightly serrate; 3 in. long by 1.25 in. wide; nearly glabrous except the midrib on the back and petiole, .25 in. long, which are scabrid hairy; opposite leaf reduced to a small ovate blade .5 in. long or wanting. *Flowers* solitary, axillary on short pedicels, slender, .125 to .25 in. long with 2 linear small bracts, all pubescent. *Calyx*-lobes lanceolate acute, hairy, .125 in. long. *Corolla* .5 in. long, white, centre yellow; tube narrowed at the base, dilated upwards, pubescent; lobes subequal, rounded; lips not very distinct. *Stamens* 2; filaments filiform, included; anthers elliptic, connate; staminodes filiform, short, clubbed. *Style* fairly long, hairy; stigma capitate. *Capsule* slender, cylindric, glabrous, 1 in. long.

PERAK: at Bujong Malacca, *Ridley* 9777; *Curtis* 3133; Larut Hills, 500 to 1500 ft., *King's Collector* 2311. On banks up to 4000 ft.

14. *DIDYMOCARPUS GLABRATA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 38 (1905). A slender branched herb over 1 ft. high, almost

glabrous except for a little pubescence on the stem and petioles. *Leaves* opposite, subequal or one leaf larger than the other; elliptic or ovate, apex subacute, base cuneate or rounded and oblique; margins entire; 1·5 to 3 in. long, 1 in. broad or less; main nerves 7 pair, with mid-rib pubescent; petiole slender, pubescent, .25 in. long or less. *Peduncles* from the upper axils 2-flowered, axillary, 2 in. long, pubescent; bracts very small, linear; pedicels .25 in. long, pubescent. *Calyx*-lobes narrowly lanceolate, .125 in. long. *Corolla* white (not seen). *Capsule* linear, acuminate, 1·5 in. long, pubescent.

JOHORE : at Gunong Panti, *King's Collector* 209.

15. DIDYMOCARPUS MALAYANA, Hook. f. in Gard. Chron. II. 123, fig. 24 (1896). *Stem* very short, up to 3 in. long. *Leaves* ovate obtuse shortly petioled to lanceolate acute, long-petioled; 7 in. long, 2·75 in. broad; main nerves 15 pairs, conspicuous, silky-hairy. *Peduncles* stout, silky-hairy, 3 to 4 in. long, scapose with 2 flowers at the top or with 2 erect branches 3 in. long bearing 8 or 9 flowers each; flowers nodding. *Calyx*-lobes linear, obtuse, pubescent, long. *Corolla* 2 in. long, bright yellow; tube narrowed at the base, gibbous, inflated above, hairy; lobes rounded, subequal. *Stamens* 2; filaments included, curved, glabrous; anthers shield-shaped with 2 projecting horns on each; staminodes minute, tooth-like. *Ovary* conic, hairy; style long, glandular-pubescent; stigma capitate. *Disk* cylindric. *Capsule* cylindric, 1 to 1·5 in. long. Bot. Mag. t. 7526; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 38.

PERAK: Bujong Malacca, *Curtis* 3300, *Ridley* 9778; Tanjong Malim, *Baldwin*; Chabong, *Scortechini* 189; Ulu Bubong and Ulu Kirling, *King's Collector* 8799?, 10197? SELANGOR: Gunong Semangko, *Curtis* 3300; Bukit Kutu, *Ridley* 7580; Ginting Bidai, *Ridley* 7581. Usually at 1500 to 3000 ft. alt.

16. DIDYMOCARPUS ALBOMARGINATA, Hemsley in Journ. Bot. XXV. 204 (1887). *Stem* 6 to 12 in. tall, pubescent, red. *Leaves* elliptic or ovate, obtuse, with a broad or cuneate base, dark green; edges and nerves white, sparsely hairy above, silky beneath; nerves about 10 pairs; 3 to 4 in. long, 1 to 1·5 in. wide. *Peduncles* axillary and subterminal, hairy, pink, 3 in. long, racemose or sparingly branched. *Calyx*-lobes lanceolate, hairy. *Corolla* yellow; tube narrow, pinkish white, dilated upwards; lobes subequal, rounded. *Stamens* 2; filaments thickened at the base, curved; anthers reniform with short processes; staminodes 2, filiform, hooked. *Ovary* cylindric, conic, pubescent; style long; stigma wide, discoid. *Capsule* cylindric, acuminate, rather thick; tip upcurved, hairy, .75 in. long. *Ridley* in Journ. Linn. Soc. XXXII. 506, and in Journ. Str. Br. R. As. Soc. No. 43, 39.

PERAK: Larút Hills, 3000 to 5000 ft., Wray; Curtis 2039, 2991; Ridley 2908; King's Collector 1817.

A species closely allied to *D. malayana*, and difficult to distinguish from it in dried specimens except from the much smaller flowers.

17. *DIDYMOCARPUS FLAVOBRUNNEA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 329 (1893). *Stem* slender, seldom branched, densely pubescent, 3 to 4 in. tall. *Leaves* alternate; ovate lanceolate, acute; base unequal narrowed; margins serrate; 7 in. long, 3 in. wide; nerves and midrib beneath covered with shining brown hairs, above sparingly pubescent. *Peduncles* 8 in. long, stiff, hispid, branched shortly dichotomously above; branches short, crowded; flowers numerous, small; bracts lanceolate, acuminate, .25 in. long, hispid; pedicels short. *Calyx*-lobes linear, narrow, pubescent. *Corolla* 1 in. long; tube cylindric, gradually dilated towards the lips; lobes unequal, rounded, short; tube brownish outside; limb yellow with an orange spot in the mouth and some red streaks. *Stamens* 2, with filiform filaments. *Ovary* elliptic. *Capsule* 1 in. long, narrowed gradually from the base, splitting above nearly to the apex, glabrous. Journ. Str. Br. R. As. Soc. No. 43, 39.

PAHANG: Tahan River woods, Ridley 2163.

The fruits crowded at the top of the peduncle radiating in all directions give this species the appearance of a *Parabæa*.

18. *DIDYMOCARPUS LONGIPES*, Clarke in DC. Monog. Phan. V. i. 86 (1883). *Stem* woody, 2 in. long, hairy at the top. *Leaves* oblanceolate, narrowed to the base; obscurely serrate; glabrous and deep green above, hairy on the midrib and purple beneath; 8 in. long, 2.25 in. broad. *Flowers* few, racemose (occasionally panicle), pendent on peduncles 9 to 18 in. long, rather stout, purple. *Calyx*-lobes linear, acuminate, pubescent, purple, .125 in. long. *Corolla* 1.5 in. long, pale yellow, pubescent; tube straight, little dilated upwards; upper two lobes short, rounded; lower longer, oblong. *Stamens* 2; filaments short, thick, adnate to the tube near the mouth; anthers reniform, connate, just included, with 2 short appressed horn-like processes to the connective. *Ovary* elongate, conic, passing into the terete style; stigma discoid. *Disk* cylindric. *Capsule* 1.25 in. long, rather thick, splitting along the upper edge. Clarke in Hook. f. Fl. Br. Ind. IV. 351; Ridley in Journ. Linn. Soc. XXXII. 509, and in Journ. Str. Br. R. As. Soc. No. 43, 40.

MALACCA: Mount Ophir, Griffith (K.D.) 3854; Cuming 2385; Main-gay (K.D.) 2723; Ridley 3179.

19. *DIDYMOCARPUS INÆQUALIS*, Ridley in Journ. Linn. Soc. XXXII. 506 (1883). *Stem* woody, 5 in. or more tall, .125 in. thick, brown-

pubescent. *Leaves* alternate, distant, lanceolate, inæquilateral, acute, serrate, narrowed to the base; velvety above, pubescent beneath; 5 in. long, 1·5 in. wide or smaller; petiole distinct, pubescent, 5 in. long. *Peduncles* from the upper axils 1·5 in. long, pubescent; flowers crowded, pedicellate; bract linear, nearly 25 in. long. *Calyx* campanulate; lobes not free to the base, linear, 125 in. long, pubescent. *Corolla* blue, 1 in. long; tube slender, enlarged upwards; lobes short, rounded; filaments long slender. *Ovary* elongate cylindric; stigma obconic. *Capsule* cylindric, glabrous, 1·5 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 41.

KEDAH: on Lankawi Island at Gunong Chinchang, *Curtis* 2568.

20. DIDYMOCARPUS ALBA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 41 (1905). *Stem* woody, creeping, ascending, hairy-pubescent. *Leaves* crowded towards the top; lanceolate, acute at base; 2 in. long, 25 to 5 in. wide, softly densely hairy on both sides; petiole densely hairy, 5 in. long. *Peduncles* short, 5 in. or less long, 1-flowered, densely hairy. *Calyx*-lobes free to base, linear, acuminate, long-hairy, 125 in. long. *Corolla* quite white, 5 in. long, base cylindric, gradually dilated upwards, hairy; lobes short, rounded, subequal. *Stamens* 2; filaments rather short, filiform; staminodes 3, filiform, clubbed, shorter. *Ovary* pubescent. *Capsule* 75 in. long, curved, acuminate, splitting along the upper surface, glabrous.

PERAK: at Bujong Malacca, *Curtis* 3299; *Ridley* 9780; *Scortechini*.

VAR. *major*, Ridley. *Stems* taller, over 1 ft. high. *Leaves* more remote and less hairy. *Peduncles* longer, 1 in. in flower, 1·25 in. in fruit. *Corolla* 1 in. long.

PERAK: at Gunong Bubu, 4500 ft., *Wray* 3209.

### Sect. III. REPTANTES.

21. DIDYMOCARPUS REPTANS, Jack in Mal. Misc. I. pt. ii. 3 (1820), and in Trans. Linn. Soc. XIV. 35. *Stems* creeping, 6 in. or more long, villous. *Leaves* opposite; ovate or elliptic, blunt at apex, narrowed or rounded at base; upper surface sprinkled with villous hairs, lower more hairy; margins obscurely crenulate; 75 to 3 in. long, 5 to 75 in. broad. *Peduncles* slender, subterminal, 1-flowered, hairy, 1 in. long; bract very small; pedicel 25 in. long. *Calyx*-lobes linear, villous, 125 in. long. *Corolla* 5 in. long, pubescent, white with purple and yellow streaks in the mouth; tube trumpet-shaped; lobes rather large, rounded. *Stamens* 2; filaments far included, filiform; staminodes very short. *Ovary* cylindric; style slender; stigma discoid. *Capsule* 1 in. long, slender, scabrid, splitting nearly to the apex. Calc. Journ. Nat. Hist. IV. 55; Spreng.

Syst. II. 837; Wall. Cat. 787; G. Don Gen. Syst. Dichl. Pl. IV. 659; R. Br. in Benn. Pl. Jav. Rar. 119, and Am. Sc. Nat. 2, XIII. 164; DC. Prodr. IX. 286; Miq. Fl. Ind. Bat. II. 726; Clarke in DC. Monog. Phan. V. i. 95, and in Hook. f. Fl. Br. Ind. IV. 352; Ridley in Journ. Linn. Soc. XXXII. 511, and in Journ. Str. Br. R. As. Soc. No. 43, 42. *Henckelia reptans*, Spreng. Syst. curæ post. 14.

PENANG: Wallich 787; Maingay (K.D.) 1223; Lobb 335; at Pulau Betong, Curtis 1706; Penang Hill, G. King. SELANGOR: Bukit Kutu, Ridley 7585.

VAR. *monticola*, Ridley. More slender, and creeping for 1·5 ft. or more; the shoots covered with rufous hairs. Leaves narrower, lanceolate, acute, narrowed into the petiole; 2 to 3 in. long, ·3 to ·5 in. broad. *D. ? producta*, Clarke in DC. Monog. Phan. V. i. 96.

PERAK: Gunong Batu Putih, Wray 480, 927; Larut Hills Curtis 2040, 2992; Ridley 2912; Scortechini 20, 257; Goping, King's Collector 1099. DINDINGS: Simpiti, near Lumut, Ridley 3062. SELANGOR: Pahang track, Ridley 8561; Ginting Bidai, Ridley 7586. NEGRI SEMBILAN: Bukit Tamiang and Bukit Sulu, Cantley's Collector.—DISTRIB. Sumatra (Horsfield).

VAR. *violascens*, Ridley. Stems ascending for 1 ft. or so. Leaves rather remote, nearly glabrous above except for dense hair on the margins and midrib, more hairy beneath; nerves elevated, densely appressed-hairy. Flowers purplish-white.

SELANGOR: Rawang, Ridley 7583; Dusun Tera, Ridley 7584.

22. DIDYMOCARPUS OPHIRENSIS, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 43 (1905). Stem creeping, over 1 ft. long. Leaves opposite, somewhat unequal, elliptic; dark green with white on the nerves, 1 to 3 in. long, ·5 to 1 in. wide, base rounded; above sprinkled with short hairs, beneath paler, more hairy; margins entire, thickly hairy; nerves 5 to 6 pairs, densely hairy; petiole ·25 in. long, hairy. Peduncles subterminal, 1 in. long, hairy. Calyx-lobes linear, ·125 in. long, densely hairy. Corolla ·75 in. long, gradually dilated forwards, rather broad at the top, hairy, purple and white; upper lip much shorter than lower one. Stamens filiform, little shorter than the corolla. Style slender; stigma capitate. Capsule cylindric, hairy, 1 in. long.

MALACCA: lower part of Mount Ophir, Ridley 3185.

Ridley says: "I took this at first to be *D. marginata*, Clarke in DC. Monog. Phan. V. i. 96, and in Hook. f. Fl. Br. Ind. IV. 352, which was based on a plant collected in Malacca or Luzon by Lobb, but which, from the description, may be a form of *D. reptans*, and the locality of which is doubtful."

23. DIDYMOCARPUS PULCHELLA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 44 (1905). Stems slender, 3 to 6 in. long, purple, covered with

appressed hairs. *Leaves* opposite, elliptic, obtuse, 1 to 2 in. long; dark green above with a central white stripe, dotted with short hairs; beneath purple, sprinkled with hairs; the nerves and edges hairy; petiole .25 to .5 in. long, hairy. *Peduncles* axillary, 1 in. long, slender, hairy; bract linear, very small; pedicel .5 in. long, slender, hairy. *Calyx*-lobes narrowed, linear, .125 in. long, hairy. *Corolla* white, with yellow in the mouth, nearly 1 in. long; tube cylindric, hardly dilated, sparingly hairy; lobes oblong, rounded. *Stamens* 2 fertile; filaments filiform, straight; anthers oblong. *Ovary* slender, cylindric, pubescent, with style .4 in. long. *Capsule* narrow, cylindric, upcurved, 1.5 in. long, pubescent.

PAHANG: Kwalla Lipis, *Machado* 11629.

24. DIDYMOCARPUS CROCEA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 44 (1905). *Stems* succulent, creeping, pubescent, 1 ft. or more long. *Leaves* opposite but unequal; ovate, obtuse; surface softly hairy, green with white veins; 1 to 3 in. long, .75 to 1.25 in. broad; nerves raised beneath; petiole .5 in. long or less. *Peduncles* subterminal, 1 to 3 in. long, 1-flowered, softly hairy; bracts 2, short, linear. *Calyx*-lobes linear, pubescent, .15 to .2 in. long. *Corolla* orange-yellow, pubescent, bilabiate, 2 in. long; tube narrowed at the base, dilated, gibbous above; lobes rounded, darker orange; lower lip longer than upper. *Stamens* 2; filaments sinuate; anthers with 2 processes each on the back; staminodes filiform, hooked. *Style* slender; stigma capitate. *Capsule* rather thick, curved upwards, 1.25 in. long, pubescent.

PERAK: Gunong Keledang, on banks, *Ridley* 9776; *Curtis* 3301; Sungkei, *King's Collector* 3014.

25. DIDYMOCARPUS ASCENDENS, Ridley in Journ. Linn. Soc. XXXII. 512 (1896). *Stem* rather slender, creeping, ascending, branched above, 4 to 8 in. high; branches 2 in. long or more. *Leaves* crowded above, opposite, subequal; ovate, subacute, narrowed or broad at base, entire; surface dark green, silky-hairy, the edges white-silky; 1.5 to 2 in. long, .5 to 1 in. broad; petiole 1 in. long or less. *Flowers* solitary on hairy peduncles .5 to 1 in. long. *Calyx*-lobes linear, acuminate, silky. *Corolla* orange-yellow, 1.5 in. long, narrow cylindric, dilated above, pubescent; lobes short, rounded, subequal. *Stamens* 2; filaments long, thick; anthers triangular, obtuse. *Ovary* cylindric, pubescent; style long; stigma ovate, triangular. *Capsule* cylindric, acuminate, 1 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 45.

PERAK: Tapa, *Haviland*; *Curtis* 3106; Goping, *King's Collector* 458.

#### Sect. IV. HETEROBÆA.

26. DIDYMOCARPUS RUGOSA, Ridley in Journ. Str. Br. R. As. Soc. No. 43,

45 (1905). *Stem* short, stout, woody, 2 to 3 in. long. *Leaves* crowded at the top, rather thick; oblong, oblanceolate, winged to the base; dentate; glabrous and strongly bullate, wrinkled above, beneath pubescent with midrib and nerves hairy; nerves very numerous and close (about 40 pairs), nervules transverse, strongly raised; 3 to 5 in. long, 1.5 to 2 in. wide. *Peduncles* slender, 3 in. long, hairy, ebracteate; flowers solitary. *Calyx*-lobes short, ovate acute. *Corolla*-tube trumpet-shaped, 1 in. long; lower lip longer than the upper; lobes broad, white with yellow central bar. *Stamens* 2; anthers narrow; connective 2-horned; staminodes short, very slender, hooked. *Ovary* and style very hairy; stigma broad, reniform.

PERAK: Hulu Selama, *Scortechini* 1273. KELANTAN: Kwala Lebir, *Dr. Gimlette*.

27. DIDYMOCARPUS PLATYPUS, Clarke in DC. Monog. Phan. V. i. 94 (1883), and in Hook. f. Fl. Br. Ind. IV. 352 (1884). *Stem* woody below, pubescent, leafy above, 4 to 22 in. long. *Leaves* sessile, alternate; oblanceolate, 8 to 13 in. long, 3 in. wide; margins serrate; above sprinkled with multicellular hairs from a swollen base, beneath glabrous except for the elevated nerves and reticulations, densely appressed hairy. *Peduncles* numerous, axillary, 1 in. long, slender, hairy; bracts 2, short, lanceolate, hairy; pedicel 1-flowered, .5 in. long, hairy. *Calyx*-lobes ovate, obtuse, hairy, .1 in. long. *Corolla* from a narrow base dilated forwards, 1.25 in. long, sparingly hairy, white with a yellow mouth; lobes broad, rounded. *Stamens* 2; filaments filiform, long; anthers reniform, with a process of the connective projecting beyond them. *Style* long, slender; stigma wide, discoid. *Capsule* cylindric, 1.5 in. long, pubescent. Ridley in Journ. Linn. Soc. XXXII. 505, and in Journ. Str. Br. R. As. Soc. No. 43, 46.

PERAK: Gunong Batu Putih, *Wray* 934; Goping, *King's Collector* 832. SELANGOR: Klang, *Beccari* 5; Kuala Lumpur, *Ridley*. NEGRI SEMBILAN: Perhentian Tinggi, *Ridley* 10097; Bukit Temiang, *Cantley*. MALACCA: *Griffith* (K.D.) 3825; *Maingay* (K.D.) 1226; *Cuming* 2359; Ayer Panas, *Derry* 111; *Harvey*. JOHORE: Ulu Batu Pahat, *Kelsall*; Gunong Pulau, *Ridley* 3729. SINGAPORE: Bukit Timah, Selitar, *Ridley*.—DISTRIB. Sumatra.

28. DIDYMOCARPUS KOMPSOBÆA, Clarke in DC. Monog. Phan. V. i. 92, t. 10 (1883). *Stem* woody, 4 to 5 in. tall. *Leaves* crowded at the top; oblanceolate, acute, narrowed towards the base; 5 to 9 in. long, 2 to 3 in. wide; margins coarsely crenate-dentate; above glabrous when adult, with a few multicellular hairs when young; beneath minutely pubescent; nerves and reticulations elevated; midrib and main nerves with long brownish appressed hairs. *Peduncles* 1-flowered, 4 in. long,

hairy. *Calyx*-lobes ovate, hairy, .125 in. long. *Corolla* white with yellow in the throat; tube 1 in. long; base narrowed, above somewhat abruptly swollen, nearly glabrous; lower lip longer than the upper one. *Stamens* 2; filaments filiform; anthers oblong. *Capsule* 1.75 in. long, moderately thick, pubescent. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 44.

PAHANG: Tahan River Woods, *Ridley* 2152. SELANGOR: Bukit Hitam, *Kelsall*.

29. *DIDYMOCARPUS QUINQUEVULNERA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 328 (1893). *Stem* woody, 6 to 9 in. tall or less, covered with brown wool. *Leaves* lanceolate, acuminate, acute, serrate, narrowed to the base; silky pubescent, dark green; 6 in. long, 2 to 2.5 in. wide. *Peduncles* slender, rosy, white-ciliate; flowers numerous. *Calyx*-lobes lanceolate, acute. *Corolla*-tube slender, dilated forwards, 3 in. long, white, 2-lipped; lobes rounded, crimson or violet-purple edged with white, with yellow streaks in the throat. *Stamens* rather thick, sinuate, white; anthers reniform. *Ovary* cylindric, pubescent; stigma cordate. *Capsule* cylindric, acuminate, 3.5 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 47.

PAHANG: Kota Glanggi, Tahan Woods, *Ridley* 2144, 2154. SELANGOR: Pahang Track, 15th mile, *Ridley* 8559.

30. *DIDYMOCARPUS ATROSANGUINEA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 328 (1893). *Stem* woody, 6 in. high, .25 in. thick. *Leaves* lanceolate, acute, crenulate, denticulate or dentate, base broad; 9 in. long, 4 in. wide; deep green velvety pubescent above, glaucescent, pubescent beneath with elevated nerves and nervules. *Peduncles* 3 in. long, pubescent; bracts ovate. *Calyx*-lobes linear, acute, .25 in. long, pubescent, red. *Corolla* pubescent, deep red, yellow in the mouth; tube 2 in. long, dilated upwards; lobes subequal, ovate obtuse. *Stamens* 2; filaments sinuous, rather thick; anthers semi-ovate. *Style* longer than the stamens, pubescent; stigma rounded. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 47.

PAHANG: Tahan Woods, *Ridley*. TRINGGANU: *Ridley*.

31. *DIDYMOCARPUS HIRSUTA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 48 (1905). *Stem* woody, over 1 ft. long, branched, densely hairy above with long multicellular hairs. *Leaves* alternate, lanceolate acuminate, narrowed to the base, crenate, densely hairy on both surfaces; 6 in. long, 1.5 in. wide; petiole .5 in. long or less. *Flowers* solitary on the peduncles in the lower and upper axils. *Peduncles* very slender, hairy, 1 in. long. *Calyx*-lobes short, ovate lanceolate, obtuse. *Corolla* narrow, 1.5 in. long, yellow, pubescent. *Capsule* very narrow, cylindric, pubescent, 3 in. long.



PERAK: Goping, *King's Collector* 715; Larút Hills, *King's Collector* 2529.

32. DIDYMOCARPUS BOMBYCINA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 32 (1905). *Stem* branched, woody, 3 to 4 ft. tall; above closely silky pubescent. *Leaves* lanceolate acuminate; 4 to 6 in. long, 1 in. across; narrowed to the base; minutely crenulate; densely silky pubescent on both sides; nerves very numerous and close. *Pedicels* short, 1 in. long, slender, silky. *Calyx*-lobes ovate, acute, small, silky. *Corolla*-tube 1 in. long, sparingly pubescent, white tinged with pink or blue, trumpet-shaped.

PERAK: Ulu Bubong, 400 to 600 ft., *King's Collector* 10587.

33. DIDYMOCARPUS CRINITA, Jack in Mal. Misc. I. II. 1 (1820), and in Trans. Linn. Soc. XIV. 33, t. 2, fig. 2 (1823). *Stem* woody, pubescent, 6 in. tall. *Leaves* narrow, lanceolate acute, narrowed to the base; shortly and closely serrate; 6 in. long, 1 in. wide; dark green above, sometimes with a white longitudinal bar, covered closely with short velvety hair; beneath purple with longer hair especially on the nerves. *Peduncles* about 1 in. long, villous; *pedicels* .25 in. long; bracts linear, all villous. *Calyx*-lobes narrow, lanceolate acute, villous, .125 in. long. *Corolla* white or usually pale blue, 1.5 in. long, pubescent; tube narrowed at the base, dilated forwards; lobes large, rounded, subequal. *Stamens*: filaments filiform, curved; anthers oblong with short lateral processes. *Style* and *ovary* cylindric, pubescent; stigma discoid. *Capsule* slender, cylindric, 2 to 3 in. long, pubescent. Calc. Journ. Nat. Hist. IV. 53, t. 15, fig. 2; Wall. Cat. 779; Spreng. Syst. II. 837; G. Don Gen. Syst. Dichl. Pl. IV. 659; R. Br. in Benn. Pl. Jav. Rar. 118, and in Ann. Sc. Nat. 2, XIII. 164; DC. Prodr. IX. 265; Hook. Bot. Mag. t. 4554; Fl. des Serres, t. 631; Lem. Jard. Fl. t. 87; Miq. Fl. Ind. Bat. II. 724; Clarke in DC. Monog. Phan. V. i. 93, and in Hook. f. Fl. Br. Ind. IV. 351; Ridley in Journ. Linn. Soc. XXXII. 505, and in Journ. Str. Br. R. As. Soc. No. 43, 49. *Henckelia crinita*, Spreng. Syst. curæ post. 13.

KEDAH: Gunong Jerai, *Ridley*; Tomoh, *Machado*. KELANTAN: Kwala Lebir, *Dr. Gimlette*. PENANG: *Wallich*; *Helper* 3834; *Gaudichaud* 71; West Hill, *Curtis* 410; *Stoliczka*; *G. King*; *Deschamps*. PERAK: Larút Hills, *Scortechini* 10294; *Ridley* 2907; *King's Collector* 2157; Tapa, *Curtis* 3781. SELANGOR: Ginting Bidai, *Ridley* 7577. SUNGEI UJONG: Bukit Sulu, *Cantley*. PAHANG: Raub Track, *Machado* 11575; Tahan Woods, *Ridley* 2169. MALACCA: *Maingay* (K.D.) 1225; *Harvey*. SINGAPORE: *Walker* 18; *Lobb* 311. — *DISTRIB.* Sumatra, Borneo.

*VAR. Curtisii*, *Ridley*. *Leaves* oblanceolate, acute, serrate, deep green

with a silvery central bar, covered with long multicellular hairs from a swollen base on both sides, very dense and longer on the back at the base and on the buds. *Scapes* 3 in. long, hairy, slender. *Calyx*-lobes oblong, hairy, blunt. *Corolla* 2 in. long, blue; tube hairy, swollen upwards; lobes unequal, 1 in. across the limb. *Stigma* broad, heart-shaped.

SELANGOR: near the Gap, *Curtis*.

VAR. *elongata*, Ridley. *Stem* tall and somewhat branched. *Leaves* scattered, narrow and small; 3 in. long, .5 in. wide, hairy. *Flowers* small, pale blue, 1 in. long, on slender pedicels 3 in. long or less, from the lower as well as from the upper axils.

PERAK: Tapah, *Curtis* 3781.

34. DIDYMOCARPUS FASCIATA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 50 (1905). *Stem* woody, 6 to 8 in. tall, with soft hair in the upper parts. *Leaves* alternate, narrowly lanceolate, acuminate, narrowed to base; 4 to 8 in. long, 1.5 in. wide; margins serrulate crenulate; above deep velvety malachite green, with a broad central white bar covered with short scattered hairs; back, edges, and petiole with longer pale silky hairs. *Peduncles* slender, short, 1.5 in. long, hairy; bract very small, linear. *Calyx*-lobes narrow, lanceolate, very small. *Corolla* 1.5 in. long, cylindric, trumpet-shaped; white limb edged violet. *Capsule* very slender, 2 in. long or less, glabrous.

KEDAH: Gunong Jerai, *Ridley*. PAHANG: Tahan River, in rocky woods, *Ridley* 2169.—DISTRIB. Lingga, Batu Gajah (*Hullett*).

35. DIDYMOCARPUS VENUSTA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 51 (1905). *Stem* erect, woody, 12 to 18 in. tall. *Leaves* oblong lanceolate, subacute, crenulate-serrate, narrowed into the petiole, winged to the base; 4 to 6 in. long, 1 to 2 in. wide; nerves elevated on both surfaces, 22 pairs; glabrous above, nerves and midrib ferruginous hairy beneath. *Peduncles* axillary, 1 or 2 in. in an axil, 7 in. long, hairy; flowers terminal, 2, large, white; bracts 2, oblong cuspidate, glabrous, .3 to .4 in. long; pedicels hairy, lower one .25, upper one .5 in. long. *Calyx*-lobes free to base, linear acuminate, pubescent, .5 in. long. *Corolla* pubescent; tube enlarged upwards, infundibuliform, 1.5 in. long, pure white with a brown spot on the lower lobes; upper lobes shorter than lower, rounded; lower lip .5 in. long, lobes oblong. *Stamens* included, 2; filaments filiform; anthers oblong; staminodes filiform, hooked. *Ovary* narrow, cylindric, with style .5 in. long; all pubescent; stigma large, cordate. *Capsule* terete, acuminate, splitting along the upper edge, glabrous, 2 to 2.5 in. long.

PERAK: Bujong Malacca, *Ridley*. SELANGOR: Gunong Semangko, *Curtis* 3751.

Ridley says this beautiful plant hardly belongs to this group. It resembles much more closely a *Didissandra*, but has 2 stamens only.

Sect. V. SALICINÆ.

36. *DIDYMOCARPUS DENSIFOLIA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 51 (1905). *Stem* woody, 3 in. tall. *Leaves* numerous, crowded, alternate; lanceolate, acuminate, narrowed to the base, rather thick in texture, entire, nearly glabrous when adult except for a few hairs on the midrib; 1·5 to 5 in. long, ·25 to ·75 in. wide. *Peduncles* hairy, slender, 3 in. long, with a few 1-flowered short branches; bracts linear, oblong. *Calyx*-lobes linear oblong, pubescent. *Corolla* not seen. *Ovary* cylindric, pubescent; style pubescent; stigma small, capitate. *Capsule* cylindric, pubescent, 1 in. long, splitting nearly to the tip.

JOHORE: Gunong Janeng, *Kelsall*.

37. *DIDYMOCARPUS SALICINA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 329 (1893). A small shrubby plant, 3 to 6 in. tall, simple or branched, glabrous below, pubescent above. *Leaves* numerous, crowded above, opposite; narrowly lanceolate, acuminate, glabrous, serrate; 3 to 4 in. long, 1·5 in. wide; pale green above, reddish beneath; petiole slender, 1·5 in. long or less. *Peduncles* numerous, crowded in the upper axils, very slender, glabrous, red, 2 in. long; branches few, divaricate, pubescent; flowers very small, ·125 in. long, pink. *Calyx*-lobes very narrow, linear-pubescent. *Corolla* campanulate; lobes ovate acute. *Stamens* 2; filaments short, slender; anthers reniform. *Style* longer than the corolla, glabrous; stigma small, capitate. *Capsule* cylindric, acuminate, ·75 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 52.

PAHANG: Tahan River, *Ridley* 2166. On stream-banks in woods.

38. *DIDYMOCARPUS SERRATIFOLIA*, Ridley. *Stem* woody, 6 in. long or less. *Leaves* numerous, lanceolate acute, narrowed at base, not petioled; strongly toothed; teeth ·125 in. long, acute; nerves 40 pairs; 8 in. long, 1 in. wide; glabrous above, midrib with pale hairs beneath. *Scape* slender, hairy, 3 in. long; flowers 4 or 5, nearly sessile. *Calyx*-lobes ovate, short hairy. *Corolla* trumpet-shaped, ·75 in. long, narrowed at base, dilated upwards; lower lip longer than upper one; ·25 in. wide, 3-lobed, side lobes rounded, median longer, oblong; white stained with purple outside, yellow in the mouth. *Capsule* very slender, over 1 in. long, pubescent, pedicelled. *D. serrata*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 52, *not of* R. Br.

PERAK: Larut Hills on rocks in dense forest, below the Tea Gardens, at about 1000 ft. alt., *Ridley* 11922.

39. *DIDYMOCARPUS PECTINATA*, Clarke in Herb. Kew., ex Oliver in Ic. Pl. t. 2246 (1892). Small shrubby plant, 6 in. or more tall, branched or simple. *Leaves* densely crowded at the top, glabrous, deeply pectinate, 6 to 7 in. long; lobes .4 in. long, .125 in. wide at the base, blunt. *Peduncles* from the upper axils several, pubescent, 2 in. long. *Calyx* "dark blue." *Corolla* white, tomentose, .3 in. long; tube cylindric, slightly inflated; upper lobe obovate, rounded. *Stamens* 2; filaments curved; anthers oblong; staminodes absent. *Disk* tubular. *Capsule* .5 to .75 in. long, pale, glabrous, rather thick, curved. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 53.

PERAK: on limestone rocks at 400 to 800 ft. alt., *King's Collector* 10711. SELANGOR: Rawang, *Ridley* 7579; *Kelsall* 1981.

#### Sect. VI. ACAULES.

40. *DIDYMOCARPUS VIOLACEA*, Ridley in Journ. Linn. Soc. XXXII. 509 (1895). *Rootstock* short, erect; stem 1 in. long, densely woolly. *Leaves* numerous, very unequal, ovate to lanceolate, acute, narrowed at the base, oblique, toothed; densely softly hairy; 2 to 8 in. long, 1.25 to 2.5 in. wide; sessile or petioled; petiole as much as 2 in. long. *Panicles* 2 to 5 in. long, lax; branches slender, pubescent. *Calyx*-lobes oblong, lanceolate, .125 in. long, glabrous. *Corolla*-tube trumpet-shaped, curved, .5 in. long, violet; upper lobes short, recurved, lower ones .25 in. longer. *Stamens* 2; filaments filiform. *Ovary* long, terete; style short; stigma clubbed. *Capsule* glabrous, cylindric, .75 in. long.

PERAK: Hermitage Hill at 5000 ft. elevation, on rocks in the stream, *Ridley* 2909.

41. *DIDYMOCARPUS LACUNOSA*, Hook. f. Bot. Mag. t. 7236 (1892). Stemless. *Leaves* crowded, oblong or ovate, cordate, tomentose, crenulate, 2 to 4 in. long, 1.5 to 3 in. across; above pubescent, beneath rusty tomentose, especially on the elevated nerves; petiole 2 to 4 in. long, rusty tomentose. *Scapes* 4 to 6 in. long, 2- to many-flowered, simple or 3- or 4-branched at the top; branches .5 in. long; flowers nodding. *Corolla* 1 in. long, deep violet blue; tube narrow at the base, gibbous, inflated upwards; lobes short, rounded, subequal. *Stamens* included, curved, swollen near the base, narrowed upwards; anthers elliptic, not horned; staminodes filiform, one-third as long. *Pistil* linear, pubescent, gradually narrowed into the style; stigma very shortly bifid. *Capsule* 2 in. long, linear. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 54.

KEDAH: Lankawi island, at Terutau, on damp rocks, *Curtis* 1655.

42. *DIDYMOCARPUS PERDITA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 54 (1905). *Stem* creeping, woody, about 4 in. long. *Leaves* elliptic obtuse, rounded, peltate; margins crenulate; 3 in. long, 1·5 in. wide; above scabrid and sprinkled over with hairs, beneath glabrous except for the midrib and nerves, which are hairy with appressed hairs; margin with hairs on the crenulations; petiole 1 to 2 in. long, hairy. *Peduncles* slender, 4 in. long, subterminal, hairy. *Calyx*-lobes lanceolate, pubescent. *Corolla* not seen. *Capsule* ·5 in. long, narrowed suddenly into the style and only splitting as far as the base of the style; stigma subbilobed, large.

SINGAPORE: Selitar, very rare, *Ridley*.

Ridley found two plants of this together in a small ravine near Selitar in 1889, one in fruit. Since then the locality has been destroyed by cultivation, and the plant has disappeared and is probably extinct.

43. *DIDYMOCARPUS PUNCTICULATA*, Ridley in Journ. Linn. Soc. XXXII. 510 (1895). Almost stemless. *Leaves* crowded, elliptic or obcuneate or nearly oblanceolate, inæquilateral, base truncate; crenate, puncticulate, hispid; 3 in. long, 1·5 in. wide or smaller; nerves beneath elevated, hairy. *Peduncles* subterminal, 3 in. long, slender, thickening in fruit, hairy. *Calyx*-lobes lanceolate, acute, ·06 in. long, hairy. *Corolla* ·25 in. long, hairy, violet; tube short, broad campanulate; lower lip longer than the upper one; lobes oblong obtuse. *Stamens* very short; filaments thick; anthers large, conic, shield-shaped; style longer, pubescent. *Capsule* ·5 in. long, thick, hispid.

JOHORE: Gunong Panti, *Ridley*.

44. *DIDYMOCARPUS HETEROPHYLLA*, Ridley in Trans. Linn. Soc. Ser. 2, III., 329 (1893). *Stem* short with a long woody root, woolly above. *Leaves* crowded, very variable in size, obovate, oblique or lanceolate, crenulate, obtuse; 4 in. long, 1·5 in. wide or less; above dark green, purplish in the centre, glabrous, beneath reddish; nerves raised, covered with red wool on the back. *Peduncles* slender, hairy, 3 in. long; branches short and few; flowers few, small. *Calyx*-lobes linear, pubescent, ·125 in. long. *Corolla* campanulate, ·25 in. long, violet, pubescent. *Style* longer, pubescent. *Capsule* cylindric, curved, acuminate, 1 in. long, glabrous, splitting for nearly the whole length. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 56.

PAHANG: Tahan River, *Ridley* 2170. JOHORE: Gunong Janeng, *Kelsall*.

45. *DIDYMOCARPUS PUMILA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 56 (1905). *Stem* slender, woody, 1 to 3 in. long. *Leaves* crowded at the top, elliptic obovate, obtuse, narrowed at the base and

inaequilateral; .5 to 1.5 in. long, .25 to 1 in. wide; above silky pubescent, beneath dotted with swollen hair-bases; nerves about 6 pairs, elevated, hairy with appressed hairs. *Peduncles* slender, erect, purple, with silky appressed white hairs, 2 to 3 in. tall, subterminal; flowers 1 to 2, terminal, very shortly pedicelled; bract linear, purple. *Calyx*-lobes linear, purple, pubescent. *Corolla* .25 in. long, with a short broad tube, pubescent, purplish-white, hardly bilabiate; lobes rounded, pinkish white. *Stamens* 2; filaments slender, short, filiform. *Ovary* slender, cylindric; style longer than stamens; stigma discoid. *Capsule* .75 in. long, terete, upcurved, splitting along the upper edge, minutely pubescent.

SELANGOR: the Gap—Semangko Pass, alt. 3000 ft., *Curtis* 3782; *Burn-Murdoch*.

#### AFFINITY DOUBTFUL.

46. DIDYMOCARPUS LILACINA, Ridley in Trans. Linn. Soc. Ser. 2, III. 330 (1893). *Stem* 12 to 15 in. long, entirely leafy, brown-pubescent. *Leaves* alternate, spreading, lanceolate, crenate dentate, pubescent, dark green; 4 in. long, 1 in. wide; petiole 1 in. long. *Pedicels* numerous, rising from the petiole near the leaf-blade, slender, .25 in. long, pubescent. *Calyx*-lobes very short, lanceolate, hispid. *Corolla* campanulate, rosy-violet, sparingly pubescent; lobes oblong, rounded. *Stamens* 2; filaments thick, with slender base; anthers reniform. *Style* shorter than the corolla, pubescent; stigma capitate. *Capsule* .65 in. long, rather thick, cylindric, with a short beak. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 57.

PAHANG: Tahan River, *Ridley* 2165.

#### 5. CHIRITA, Buch.—Ham.

Herbs or slender shrubs. *Leaves* opposite, often unequal or whorled or alternate; elliptic or ovate. *Peduncles* axillary, 1- or more flowered; bracts free or connate, small or large. *Calyx* 5-lobed, with acute lobes, usually large. *Corolla* infundibuliform or tubular-ventricose, blue or white, 2-lipped; lobes rounded. *Stamens* 2; filaments filiform, geniculate; anthers rounded, connivent, often hairy. *Disk* annular. *Ovary* cylindric, linear; style usually long; stigma ovate or narrow, bifid. *Capsule* long, cylindric.—DISTRIB. Species about 26, in India, China, and Malaya.

Bracts free:—

Stems 2 ft. high; leaves ovate; corolla 1 in. long, claret-coloured .. .. .

Stems under 2 ft. high; corolla blue or violet, rarely white:—

.. 1. *C. elata*.

Leaves ovate :—

Corolla 1·5 in. long, azure blue; stems 1 ft. high or more .. 2. *C. caliginosa*.

Corolla ·75 in. long, violet with darker streaks; stems  
under 1 ft. high .. .. 3. *C. viola*.

Leaves lanceolate; corolla blue, rarely white .. 4. *C. sericea*.

Bracts connate; leaves ovate; corolla blue or violet :—

Corolla-tube ·5 in. long .. .. 5. *C. rupestris*.

Corolla-tube 1 in. long .. .. 6. *C. Glasgovii*.

DOUBTFUL SPECIES.

7. *C. mollissima*.

1. *CHIRITA ELATA*, Ridley in Journ. Linn. Soc. XXXII. 518 (1895).  
A tall rough herb, 2 ft. high. *Stem* angled, branched. *Leaves* 3 to 6 in. long, 1·5 to 3 in. wide, ovate, inæquilateral, acute, toothed; with elevated nerves, hispid; petioles slender, 1 in. long. *Cymes* lateral, axillary, 3 in. long, hispid. *Calyx*-lobes lanceolate acuminate, hairy, ·125 in. long. *Corolla* funnel-shaped, hairy, 1 in. long, claret colour; lobes short, rounded, subequal, ·5 in. across. *Stamens* 2; filaments slender; anthers oblong; staminodes short, with abortive anthers. *Ovary* short, pubescent; stigma peltate, sub-bilobed. *Capsule* straight, cylindric. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 57.

PERAK: Larút Hills, *Wray* 2985; *Curtis* 2038; *Ridley* 2911.

2. *CHIRITA CALIGINOSA*, Clarke in DC. Monog. Phan. V. i. 122 (1883).  
A soft herb, 1 ft. or more tall, often branched. *Leaves* opposite; ovate acuminate, base broad or cuneate, very inæquilateral; margins entire or slightly toothed; 2·5 in. long, 1 to 2 in. wide; closely pubescent; petiole ·5 in. long. *Flowers* several, axillary; pedicels ·5 to 1 in. long, pubescent. *Calyx*-lobes lanceolate acuminate, hairy, 5 in. long. *Corolla* 1·5 in. long, azure blue; tube narrow at the base, broadly infundibuliform at the apex, pubescent; lobes large, rounded, ·75 in. across the lips. *Stamens* 2; anthers globose, covered with long hairs at base. *Style* slender, pubescent; stigma bilobed, lobes linear. *Capsule* 3 in. long, slender, cylindric, curved. Clarke in Hook. f. Fl. Br. Ind. IV. 360; Ridley in Journ. Linn. Soc. XXXII. 516, and in Journ. Str. Br. R. As. Soc. No. 43, 58.

PERAK: Kuala Dipang, *Curtis* 3109; Batu Kuran, *Scortechini* 1582  
SELANGOR: Kuala Lumpur caves, *Beccari*; *Curtis* 2359.

3. *CHIRITA VIOLA*, Ridley in Journ. Linn. Soc. XXXII. 516 (1895).  
A herb, 2 to 10 in. tall, pubescent. *Leaves* ovate acute, crenate or serrate or entire, very unequal, 2 to 6 in. long, 1·5 to 3 in. wide; petiole ·125 in. long. *Cymes* short, few-flowered; flowers small; pedicels ·5 in. long. *Calyx*-lobes lanceolate, acute, hispid, nearly ·125 in. long. *Corolla* ·75 in. long, violet; tube narrow at the base, thin, dilated,

trumpet-shaped; upper lobes short, rounded, lower ones ovate obtuse, longer, median one longest, elliptic, all violet with darker streaks and a patch of yellow glandular hairs in the mouth. *Stamens* 2, exsert; anthers yellow, ovoid, with a thickened connective, ciliate at the base, with a black spot on each anther; filaments attached to the mouth of the tube. *Ovary* pubescent; stigma obliquely bifid; lobes linear, obtuse. *Capsule* terete, acute, 1.5 in. long, minutely pubescent. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 59.

KEDAH: Lankawi Islands, *Curtis* 2570.—DISTRIB. S. Siam, on limestone rocks.

4. *CHIRITA SERICEA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 59 (1905). Herb, 3 to 6 in. tall, simple or branched, woolly. *Leaves* alternate, lanceolate, acute or acuminate, base unequal, cuneate; 2 to 3 in. long, .5 in. wide; margins entire; both sides densely covered with short silky hairs; petiole .25 to 1 in. long. *Flowers* 1 to 2, axillary; pedicels .5 in. or less, silky-hairy, ebracteolate. *Calyx*-lobes narrow, linear acuminate, densely silky-hairy. *Corolla* blue, rarely white; tube half as long again as sepals; lobes broader, unequal, oblong, all hairy. *Style* slender, glabrous; stigma bilobed, lobes elliptic. *Capsule* cylindric, 1.5 in. long, silky-hairy.

PERAK: Ipoh, limestone rocks, *Curtis* 3131.

VAR. *Scortechinii*, Ridley, l.c.

*Capsule* shorter, .5 in. long, and thicker, .125 in. through, splitting longitudinally into 2 valves. *Corolla*-tube straight; lobes of lower lip broad.

PERAK: *Scortechinii* 102, 112.

5. *CHIRITA RUPESTRIS*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 59 (1905). A herb, about 4 to 10 in. tall. *Stem* simple or branched, glabrescent. *Leaves* opposite or alternate, thin, ovate obtuse; 1 to 3 in. long, .5 to 2.5 in. wide; above sprinkled with multicellular hairs. *Flowers* axillary, 1 to 2, sessile, on a peduncle .5 in. long, hairy, enclosed in a green cupular bilobed bract .5 in. long; edges recurved and covered with multicellular hairs. *Calyx*-lobes narrowly lanceolate, hairy, nearly .5 in. long. *Corolla*-tube as long as the bract, hairy, blue, little longer than the calyx-lobes, rounded. *Ovary* and style slender, hairy. *Capsule* cylindric, slender, curved, 2.5 in. long.

KEDAH: Lankawi, on damp rocks, *Curtis* 2120.

6. *CHIRITA GLASGOVII*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 60 (1905). A weak herb, 1 ft. tall, branched. *Leaves* ovate obtuse, thin; 1 to 3 in. long, .75 to 2 in. wide; base rounded, retuse; nerves 5 pairs, alternate; above sprinkled with multicellular hairs, beneath paler with a few hairs on the nerves, otherwise nearly glabrous; petiole



slender, 1 to 2 in. long, glabrous. *Bract* convolute, bilobed; lobes ovate, hairy, 1 in. long. *Calyx*-lobes lanceolate acuminate, narrow, hairy, .5 in. long. *Corolla*-tube 1 in. long, minutely hairy, dark violet. *Capsule* cylindric, curved, 3 in. long, glabrous.

PERAK: Waterloo near Kuala Kangsa, *C. Robertson-Glasgow*.

#### DOUBTFUL SPECIES.

7. *CHIRITA MOLLISSIMA*, Ridley in Journ. Linn. Soc. XXXII. 517 (1895). Nearly stemless. *Leaves* congested, lanceolate, acute, obscurely minutely serrate, silvery-tomentose; 6 to 8 in. long, 1.25 to 2 in. broad. *Flowers* pedicelled, drooping, axillary, few, handsome; pedicels somewhat thick, woolly; 1 in. long. *Calyx*-lobes lanceolate, acuminate, equal, .5 in. long, tomentose. *Corolla* funnel-shaped, more than 1 in. long, oblong, obtuse; the upper lobes short, rounded, violet, the lower wider; the tube white in the throat, with glandular hairs above the anthers. *Stamens* 2; filaments broad, curved; anthers broad, thick. *Pistil* pubescent, emerald green, little exsert; the ovary cylindric, attenuated in the style; stigma 2-lobed, pubescent, decurved. *Capsule* 1 in. long, broad, thick, glabrous or pubescent.

SIAMESE STATES: Pangah, *Curtis* 2944.

#### 6. *TETRAPHYLLUM*, Griff.

Undershrubs; stem elongate, with leaves crowded towards the apex. *Leaves* opposite or in whorls of 4, nearly sessile, ovate, unequal-sided. *Cymes* capitate or lax from the axils of the upper leaves; bracts elliptic, oblong or lanceolate. *Calyx* somewhat large, 5-partite, obscurely 2-lipped. *Corolla* widely funnel-shaped, more or less 2-lipped; lobes 5, subequal, ovate. *Stamens* 2, fertile; filaments short, filiform, often spirally twisted; anthers 2-celled; apex submucronate; cells oblong or ellipsoid, parallel or divergent; staminodes very minute. *Ovary* ellipsoid, acute; style linear; stigma small, capitate, sub-bilobed; placenta parietal, 2-lamellate; ovules very numerous. *Capsule* ovate or lanceolate, dehiscing both loculicidally and septicidally; having 2 ribs united at the tip and the placenta split into 2 lamellae. *Seeds* very minute, ellipsoid; testa reticulate.—*DISTRIB.* 2 species, one Indian, the other of the Malay Peninsula.

*TETRAPHYLLUM ROSEUM*, Stapf ex Ridley in Journ. Linn. Soc. XXXII. 524 (1895). *Leaves* opposite, closely approximate, the end ones subverticillate, usually in fours; elliptic or obovate-elliptic, obtuse at apex, narrowed at base; crenate-denticulate; above green, shining, bullate, pilose; beneath pale, punctulate, pilose on the nerves; 2.5 to 3.5 in. long, 1.75 to 2.25 in. broad; petiole .15 to .2 in. long.

*Cymes* few-flowered, from the axils of the last 3 or 4 leaves, collected in a terminal inflorescence 1 in. long; bracts oblong or lanceolate; pedicels slender, about .2 in. long. *Calyx* deeply 5-fid, scarcely .5 in. long; lobes ovate acute; tube obscurely 5-angled, glabrous. *Corolla* glabrous; tube nearly .5 in. long, white, curved; limb pink, bilabiate, upper lip erect, 2-lobed, lower lip 3-lobed, lobes rounded. *Stamens* included; filaments filiform, spirally twisted, glabrous; anthers adhering at the apex, with a thick connective; cells oblong, divergent at base. *Ovary* oblong, puberulous; style as long as ovary; stigma capitate, sub-bilobed; placentæ 2-lamellate; the lamellæ densely ovule-bearing. *Capsule* ovate-oblong, .3 to .5 in. long, as long as the persistent calyx.

SIAMESE STATES: Pungah, *Curtis*.

#### 7. LOXOCARPUS, Br.

Herbs, scapigerous. *Leaves* ovate or oblong, petiolate, pubescent. *Flowers* 1 or more in a peduncled cyme, blue. *Calyx*-lobes 5, free to base or nearly so. *Corolla* campanulate, small, hardly bilabiate; lobes rounded. *Stamens* 2; filaments short, thick, sinuate; anthers reniform, large. *Ovary* oblong; style longer than stamens; stigma capitate. *Capsule* follicular, conic, dehiscing along the upper edge.—DISTRIB. Species 7, of the Malay Peninsula and Borneo.

Flowers 1 or 2 on slender silky scapes 2 to 2.5 in. long .. 1. *L. semitorta*.  
Flowers few or numerous on dichotomously branched viscidly hairy peduncles:—

Peduncles 2 to 4 in. long; flowers few or numerous; capsule

ovoid .. .. 2. *L. incana*.

Peduncles 6 to 12 in. long; flowers numerous; capsule cornicu-

late .. .. 3. *L. cærulea*.

1. LOXOCARPUS SEMITORTA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 61 (1905). Stemless. *Leaves* numerous; ovate or oblong, obtuse, rather thick, base broad; .3 to 1 in. long, .25 to .75 in. wide; above green silky, beneath with thick red-woolly raised nerves; petiole 1 to 2.5 in. long, thick, red-woolly. *Scapes* slender, 2 to 2.5 in. long, silky; flowers 1 or 2. *Calyx*-lobes lanceolate, hairy, .125 in. long. *Corolla* .5 in. long; tube broad, oblique, pale blue with violet streaks in the throat; lobes very short and indistinctly marked. *Stamens*: filaments short, curved; anthers reniform, purple. *Ovary* and style hairy, shorter than corolla, larger than stamens. *Capsule* .25 in. long, horn-shaped, acuminate with the persistent style; base swollen. *Didymocarpus semitorta*, Clarke in DC. Monog. Phan V. i. 99, and in Hook. f. Fl. Br. Ind. IV. 352.

MALACCA: Mount Ophir, *Griffith* (K.D.) 3836; *Maingay* (K.D.) 1220; *Ridley* 3184, and all collectors. On rocks in the stream. "The Mount Ophir Violet."

2. *LOXOCARPUS INCANA*, R. Br. in Benn. Pl. Jav. Rar. 115, 120 (1840), and Ann. Nat. Sci. XIII. 2, 167. Stemless. *Leaves* ovate, cordate, serrulate, subacute, silky-tomentose above and beneath; 1 to 3 in. long, .75 to 1.5 in. wide; petiole .75 to 1 in. long. *Peduncles* 2 to 4 in. long, above dichotomously branched, viscid-hairy; flowers few or numerous. *Calyx*-lobes lanceolate, pubescent, hairy, white tinted green. *Corolla*-tube straight, thick; upper lobes oblong, recurved, lower lobes oblong, blue. *Filaments* straight. *Pistil* conic; style stout; stigma capitate. *Capsule* ovoid; tip upcurved, hairy. Miq. Fl. Ind. Bat. II. 737. *L. alata*, A. DC. Prodr. IX. 277. *Didymocarpus incana*, Benth. and Hook. f. Gen. Pl. II. 1022; Clarke in DC. Monog. Phan. V. 98, and in Hook. f. Fl. Br. Ind. IV. 352; *Ridley* in Journ. Linn. Soc. XXXII. 5121, and in Journ. Str. Br. R. As. Soc. No. 43, 62. *Loxonia* ? *alata*, Wall. Cat. 809.

PENANG: Government Hill, Waterfall, *Curtis* 297; *Maingay* (K.D.) 1228; *Wallich* 809. PERAK: Hermitage Hill, *Ridley*; Bujong Malacca, *Ridley* 9782. SELANGOR: Bukit Kutu, *Ridley*.

3. *LOXOCARPUS CÆRULEA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 62 (1905). Stemless or nearly so. *Leaves* several; ovate; base cordate; serrate, inæquilateral; 2 to 6 in. long, 1.5 to 4 in. wide; silky-hairy above, tomentose beneath; petiole 2 to 8 in. long, pubescent. *Peduncles* 6 to 12 in. tall, viscid-hairy; cymes compact or branched with 2 or 3 branches 2 in. long; flowers numerous; bracts lanceolate, narrow. *Calyx*-lobes lanceolate, narrow, shorter than the tube. *Corolla* pubescent, 2-lipped, .4 in. long and wide; tube short, broad, campanulate; upper lobes oblong obtuse, lower ones truncate, median one longer, blue with a violet mouth. *Stamens* exsert; filaments suddenly thickened in the middle, sigmoid; anthers connate, deep violet. *Style* slender. *Capsule* .4 to .5 in. long, lanceolate acute, horn-shaped, upcurved, viscid. *Didymocarpus cærulea*, *Ridley* in Journ. Linn. Soc. XXXII. 513.

PERAK: Larút Hills, at 5000 ft. alt., *Ridley*; *King's Collector* 6990; *Scortechini* 1427; Gunong Bubu, *Wray* 3809. SELANGOR: Bukit Hitam, *Kelsall*.

#### 8. *PARABŒA*, *Ridley*.

Herbaceous plants or with a shrubby stem. *Leaves* usually in a rosette, tomentose or hairy. *Flowers* small, white or pink, in simple or panicled cymes; peduncle usually long. *Calyx* small. *Corolla* white

explanate, campanulate, with a very short tube, distinctly 2-lipped or nearly regular; lobes equal, oblong or unequal, blunt. *Stamens* 2, fertile; filaments thick, short; anthers large, 2-celled, connivent by the tips. *Disk* none. *Ovary* sessile; style longer than the stamens, stout; stigma small, capitate. *Capsule* straight, narrow, slender, not twisted, splitting longitudinally. **DISTRIB.**—Species about 20. Siam-Malaya.

**Corolla-tube, campanulate:—Sect. I. CAMPANULATÆ:—**

Corolla .5 in. long:—

Flowers many in large spreading panicles; leaves sparingly hispid, opposite .. .. 1. *P. cordata*.

Flowers solitary or few on slender peduncles:—

Peduncles subterminal; leaves opposite, ovate:—

Leaves hairy on margins and on midrib and nerves beneath; peduncles 1-flowered .. .. 2. *P. campanulata*.

Leaves quite glabrous; peduncles branched dichotomously, branches 1-flowered .. .. 3. *P. Scortechinii*.

Peduncles axillary; leaves crowded at apex of stem, lanceolate .. .. 4. *P. cœrulea*.

Corolla under .5 in. long; flowers few, crowded .. .. 5. *P. pyroliflora*.

**Corolla-tube not campanulate, very short:—Sect. II. BREVIFLORÆ:—**

Corolla-lobes equal or subequal, if slightly 2-labiate the lower lip hardly longer than the upper:—

Flowers in compact umbels or cymes on pedicels .5 in.

long or less at the apex of the peduncles:—

Leaves not purple beneath, in a basal rosette; stem 0:—

Flowers umbellate, pedicels .5 in. long; leaves ochre-yellow beneath .. .. 6. *P. capitata*.

Flowers in compact scorpioid cymes; leaves pale beneath .. .. 7. *P. ferruginea*.

Leaves purple beneath, crowded at the apex of a short stem; flowers umbellate, pedicels .25 in. long .. .. 8. *P. regularis*.

Flowers at the apex of slender cyme-branches 1 to 3 in. long:—

Leaves ochreous-tomentose beneath in a basal rosette; stem 0 .. .. 9. *P. polita*.

Leaves red-woolly beneath; stem 2 in. long .. .. 10. *P. vulpina*.

Corolla lobes distinctly unequal, these of lower lip longer than those of upper:—

Calyx-lobes lanceolate; leaves obovate, coarsely toothed, dull green; corolla .25 in. across .. .. 11. *P. laxa*.

Calyx-lobes oblong or linear oblong obtuse:—

Leaves oblong-elliptic, sparsely hairy; corolla .5 in. across .. .. 12. *P. Curtisii*.

Leaves obovate, arachnoid on both sides, yellowish beneath; corolla .25 in. across .. .. 13. *P. obovata*.

1. *PARABÆA CORDATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 64 (1905). A tall herb, 2 ft. high; stem pubescent. *Leaves* opposite, ovate acuminate, inæquilateral at base, dentate, sparingly hispid above and beneath; nerves 10 pairs, hairy beneath; 6 to 7 in. long, 4 in. wide; petiole 1 in. long. *Peduncles* stout, 6 to 8 in. long, pubescent, bearing a spreading panicle 4 to 6 in. long; bracts in pairs at the base of each bifurcation, ovate, glabrous, .125 in. long; pedicels slender, .5 in. long, glabrous. *Calyx*-lobes lanceolate, free to base, glabrous, .5 in. long. *Corolla* campanulate, .5 in. long, white tinted violet; lobes short, equal, rounded, with 2 rows of glands on each. *Stamens* 2; filaments short; anthers subglobose, large; staminodes minute. *Ovary* slender, glabrous. *Capsule* sausage-shaped, 4-angled, 1.5 in. long, glabrous, rather thick, splitting on two sides. *Seeds* minute, deep red, oblong. *Didymocarpus cordata*, Jack; R. Br. Benn. Pl. Jav. Rar. 119; Ann. Sc. Nat. 2, XIII. 164; Wall. Cat. 781; DC. Prodr. IX. 265; Miq. Fl. Ind. Bat. II. 726; Clarke in DC. Monog. Phan. V. 84, t. 9, and in Hook. f. Fl. Br. Ind. IV. 350; Ridley in Journ. Linn. Soc. XXXII. 514.

PENANG: Wallich 781; Maingay (K.D.) 1224; W. Fox; Curtis 452. PERAK: Larut Hills, Scortechini 296, 400; Ridley 2913, 10682; King's Collector 2227, 2331, 6378. Common on rocks at 2000 to 6000 ft. alt.

VAR. *debilis*, Ridley. Rhizome fleshy; stem 6 in. tall, pubescent. *Leaves* thin, ovate oblique; base obtuse; apex acute or subacute; margin crenate dentate; sparingly hispid, 1.5 to 4 in. long, 1 to 2 in. long. *Panicle* 4 to 6 in. long, glabrous, weak, few-branched; branches short and thin; bracts ovate; flowers smaller.

KEDAH: Gunong Jerai, Ridley.

VAR. *ophirensis*, Ridley.

Tall and weak. *Leaves* thin, lanceolate, subacute or acute, narrowed at the base; 6 in. long, 2 in. wide. *Panicle* weak, glabrous; bracts lanceolate; flowers smaller, white. *Capsule* smaller, curved, .4 in. long.

MALACCA: Mount Ophir, on a big cliff in the forest below Padang Batu, Ridley 3183.

2. *PARABÆA CAMPANULATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 65 (1905). *Stem* slender, herbaceous, 1 ft. tall, shortly hairy. *Leaves* opposite, in distant pairs, elliptic acute, entire or obscurely crenulate; above glabrous except the edge fringed with multicellular hairs; beneath glabrous except the midrib and elevated nerves about 12 pairs; scurfily hairy; 2.5 to 3.5 in. long, 1.25 in. wide; petiole scurfy-hairy .125 to .375 in. long. *Peduncles* subterminal, 1.5 in. long, 1-flowered, rufous-hairy; bracts 2, alternate, linear, minute; pedicel .5 in. *Calyx*-lobes linear, hairy, .125 in. long. *Corolla* campanulate, .5

in. long, apparently white; lobes broad, rounded. *Stamens* 2, very short; anthers subglobose. *Style* slender, pubescent. *Capsule* (unripe) cylindric, velvety, .75 in. long, including the style.

SELANGOR: above the Gap on the road to the Sempang mine, 3000 to 4000 ft., *Curtis*—a single specimen.

A very distinct plant of a weedy habit, with solitary flowers of the type of *P. cordata*.

3. *PARABCEA SCORTECHINII*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 66 (1905). *Stem* herbaceous, glabrous. *Leaves* opposite; ovate acuminate; base rounded, inaequilateral; margins crenate; quite glabrous; nerves 8 pairs; 3 to 3.5 in. long, 1 to 2.5 in. wide; petiole .5 in. long. *Peduncle* slender, erect, subterminal, 3 in. long, glabrous; branches dichotomous, few, 1 in. long; flowers solitary on the ends of the branches. *Calyx*-lobes free almost to the base, oblong obtuse, .125 in. long, glabrous, fleshy. *Corolla* campanulate, .5 in. long, glabrous; lobes rounded. *Anthers* broad, elliptic; filaments very short.

PERAK: *Scortechini* (no number or locality).

A single incomplete specimen. The plant is allied to *P. cordata*, of which it has quite the flowers, but is quite glabrous.

4. *PARABCEA CÆRULEA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 66 (1905). *Stem* woody, 3 to 4 in. long, .125 in. through. *Leaves* crowded at the top, narrowly lanceolate, linear acuminate, narrowed gradually to the base; 4 to 5 in. long, .25 in. wide; above dark green, nearly glabrous; midrib prominent, beneath pale cinnamon colour; nerves about 30 pairs joined at the tips. *Peduncles* slender, axillary, 4 in. long, pubescent, 1- to 2-flowered. *Calyx*-lobes linear, .125 in. long, obtuse. *Corolla* campanulate, .5 in. long and nearly as wide at the base, pubescent, base pale; lobes deep blue, rounded. *Stamens* 2; filaments very short, sigmoid; anthers broad, rounded, oblong. *Style* fairly stout; stigma heart-shaped. *Capsule* very narrow, cylindric, 1 in. long.

TRINGGANU: Bundi, *E. Rostado*. The upper part of the stem among the leaves is covered with silvery hairs.

5. *PARABCEA PYROLIFLORA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 67 (1905). *Stem* woody, 3 in. tall or more, pubescent. *Leaves* alternate, ovate or ovate lanceolate, acuminate at both ends; 3 to 4 in. long, 1.5 in. wide; entire; bright green, silky pubescent above, beneath paler; petiole over 1 in. long, pubescent. *Peduncles* several from the upper axils, erect, 3 to 4 in. long, shortly hairy. *Calyx*-lobes lanceolate, short-pubescent. *Corolla* campanulate, funnel-shaped, white, .4 in.

long; lobes short, rounded. *Stamens* 2; filaments short and thick; anthers large, elliptic. *Style* thick, curved upwards, longer than the corolla; stigma very small, capitate. *Capsule* spreading, 1 in. long, terete, terminated by rather a long style, glabrous. *Didymocarpus pyroliflora*, Ridley in Trans. Linn. Soc. Ser. 2, III. 330.

PAHANG: Tahan river woods, *Ridley* 2164.

6. *PARABÆA CAPITATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 67 (1905). Stemless or with a stout rootstock. *Leaves* in a rosette, orbicular, base rounded, subpeltate; 6 in. long, 5 in. wide; bright green, glabrous above, ochre-yellow beneath; tomentose; nerves raised, reticulate; petiole stout, 2 in. long. *Peduncle* slender, 8 in. tall; flowers numerous in an umbel on the top, with 2 broad, blunt, oblong bracts, .25 in. long, below. *Pedicels* .5 in. long. *Calyx* campanulate; lobes linear, oblong, obtuse, .3 in. long, green, hairy. *Corolla* .5 in. across; lobes subequal, rounded, white. *Filaments* very short, straight; anthers reniform. *Style* curved up, longer than corolla, white. *Capsule* spreading, linear, straight, beaked, 1.5 in. long.

PERAK: Bujong Malacca, *Curtis* 3215; Kamuning, *Machado*. On limestone rocks.

VAR. *oblongiflora*, Ridley. *Leaves* oblong, narrowed at the base.

PERAK: Kuala Dipang and Sungei Siput, *Curtis* 3107; Tambun *Ridley* 9832; Batu Kuran, *Scortechini* 1581; Goping, *King's Collector* 456, 4325.

7. *PARABÆA FERRUGINEA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 68 (1905). Stemless or nearly so. *Leaves* in a rosette, ovate cordate, obtuse, crenulate; above covered with scattered hairs, below tomentose with longer hairs, paler; nerves elevated; 3 in. long, 2.5 in. wide; petiole 1.5 to 2 in. long. *Peduncles* 3 in. long, ferruginous-tomentose; cyme compact, scorpioid, ferruginous-hispid. *Calyx*-lobes as long as the corolla, green, ferruginous-hispid, lanceolate. *Corolla*-tube very short; limb explanate, not bilabiate; lobes broad, obovate, obtuse, subequal and similar, white or tinted with rose. *Stamens* 2, short; filaments broad, spathulate, thick; apex 3-toothed; anthers conic, connate by the tips. *Ovary* conic; stigma rounded, entire, discoid.

KEDAH: Lankawi, on damp rocks, *Curtis* 2566.

8. *PARABÆA REGULARIS*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 68 (1905). *Stem* woody, 1.5 in. long. *Leaves* crowded at the top, very unequal, oblong-lanceolate, obtuse, base cuneate inæquilateral; margins crenulate; dark green, glabrous above, purple, minutely tomentose beneath, with elevated nerves; 3 in. long, 1.5 in. wide; petiole 1.5 in. long, tomentose. *Peduncles* slender, pubescent, 1 in. long; branches

very short and slender, .25 in. long, umbelled, brown-tomentose; bracts lanceolate, obtuse; flowers few, very small, very shortly pedicelled. *Calyx*-lobes lanceolate, brown-tomentose, as long as the corolla-tube. *Corolla* hardly .25 in. across, white; lobes oblong, obtuse, equal, not bilabiate. *Stamens* 2; filaments sigmoid, thick; anthers rounded, ovoid. *Style* longer than stamens; stigma capitate. *Capsule* .5 in. long, cylindric, scabrid, rather thick, straight. *Didymocarpus regularis*, Ridley in Journ. Linn. Soc. XXXII. 515.

KEDAH: Lankawi Islands, *Curtis*.

9. *PARABÆA POLITA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 69 (1905). Stemless. *Leaves* in a rosette, ovate, crenate, obtuse; base rounded; above deep shining green, beneath ochreous tomentose, with nerves and nervules reticulate; 1 to 8 in. long, 4 to 4.5 in. wide; petiole 4 in. long. *Peduncle* over 1 ft. long, slender, with brown ochreous fur; branches few, 3 in. long, umbellate; bracts linear, oblong obtuse, brown-woolly; pedicels .25 in. long. *Calyx*-lobes linear, green, .125 in. long. *Corolla* sub-bilobed, .5 in. across, white, back tinted pink; lobes rounded. *Stamens* 2; filaments thickened at the base; anthers orange, reniform. *Style* stout, pink at base, white above; stigma capitate.

PERAK: Bujong Malacca, *Curtis* 3214 *part*.

Ridley thinks it is perhaps a hybrid between *P. capitata* and *P. vulpina*.

10. *PARABÆA VULPINA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 69 (1905). *Stem* 2 in. long, thick, covered with red wool. *Leaves* elliptic, rounded at each end, crenulate, above sprinkled with pale multicellular hairs, beneath covered densely with branched rufous hairs arranged stellately; nerves beneath strongly elevated, 6 pairs; reticulations elevated; 1.5 to 3 in. long, 1 to 2 in. wide; petiole 1 to 3 in. long, densely red-woolly. *Peduncles* slender, 6 to 8 in. long, red, with a few branched hairs; branches slender, 1 to 3 in. long, trichotomous; bracts very small, linear, obtuse, glabrous. *Calyx*-lobes narrow, linear, glabrous. *Corolla* white, .25 in. across; lobes rounded, subequal. *Stamens* 2; anthers very large, reniform. *Style* short, thick. *Capsule* cylindric, narrow, glabrous.

PERAK: Bujong Malacca, *Curtis* 3214; Hot Springs, Ipoh, *Curtis* 3132. On limestone rocks.

11. *PARABÆA LAXA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 70 (1905). *Stem* very short, woody, thickly brown-tomentose. *Leaves* obovate, coarsely crenate-serrate, narrowed at the base into the winged petiole; 3 to 7 in. long, 2 to 3 in. wide; dull green, densely hairy, tomentose on both surfaces. *Peduncle* slender, 5 to 6 in. long, terminated by a much-branched umbel of slender branches 3 in. long; pedicels



slender, .125 in. long; flowers numerous; bracts very small. *Calyx* shortly 5-cleft; lobes lanceolate, short, green. *Corolla* .125 in. across, white or tinted rosy; upper lobes broad, oblong, recurved; lower lip shortly trifid; central lobe broadest. *Filaments* short, swollen in the middle; anthers yellow, reniform. *Style* longer than stamens. *Capsule* linear, cylindric, straight, .5 in. long, tipped with the elongate style.

KEDAH: Lankawi at Kwah, *Curtis* 2571.

12. *PARABCEA CURTISII*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 70 (1905). Stemless. *Leaves* oblong, elliptic, crenate, obtuse; 6 in. long, 2.5 in. wide; above sprinkled with hairs; petiole rufous-hairy, 1.5 in. long. *Scapes* 10 in. long, rufous-tomentose, bearing an umbel of 4 or 5 branches at the top about 2 in. long; bracts at base of umbel oblong, obtuse, .25 in. long; pedicels short, rufous-tomentose. *Calyx*-lobes linear, oblong, obtuse, hairy, .125 in. long. *Corolla* .5 in. across, white; buds tinted pink; tube very short; limb bilobed; upper lobes short, rounded, lower lobes larger. *Stamens*: filaments very short, thick, curved; anthers reniform, triangular. *Style* much longer than stamens, bent. *Ovary* cylindric; stigma wide, discoid. *Capsule* (unripe) cylindric, acuminate, straight.

PERAK: Bujong Malacca, *Curtis* 3214.

13. *PARABCEA OBOVATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 71 (1905). *Stem* short. *Leaves* crowded at the top, thin, obovate, blunt; base cuneate; 3 in. long, 1.5 in. wide; thinly arachnoid on both surfaces, beneath yellowish; petiole .25 in. long. *Peduncle* slender, 3 to 6 in. long, glabrous; branches few, terminal; bracts narrowly oblong, obtuse. *Calyx*-lobes oblong, obtuse, glabrous. *Corolla* .25 in. across; lower lip longer than upper one; lobes oblong, rounded. *Stamens* 2; anthers reniform; filaments short and thick. *Style* short and thick; stigma capitate.

KEDAH: Lankawi, Gunong Chinchang, *Curtis*. One specimen only seen.

#### 9. *BCEA*, Commers.

Herbs or shrublets with a woody stem. *Leaves* opposite or whorled, generally on the back. *Peduncles* axillary, usually elongate, laxly or compactly cymose or paniced; bracts small; flowers large or small, blue or white. *Calyx* of 5 narrow sepals. *Corolla* widely campanulate, with a short tube usually distinctly 2-lipped; lobes ovate, obtuse. *Stamens* 2, perfect, with short curved thick filaments; anthers ovoid, coherent; cells ovoid. *Disk* absent. *Ovary* sessile; style as long, glabrous above; stigma small, capitate. *Capsule* slender, cylindric or

fusiform-cylindric, when ripe spirally twisted. *Seeds* minute.—**DISTRIB.** Species about 22 in India, Siam, China, and Malaya.

Corolla limb 1·5 in. across, blue; sepals pubescent .. .. 1. *B. paniculata*.  
Corolla limb less than 1 in. across:—

Calyx-lobes more or less pubescent:—

Stems 1 ft. or more in height:—

Corolla blue:—

Leaves white beneath .. .. 2. *B. verticillata*.

Leaves yellowish-brown beneath .. .. 3. *B. cærulescens*.

Corolla white .. .. 8. *B. suffruticosa*.

Stems under 6 in. in height:—

Leaves arachnoid above; corolla rose-pink .. .. 5. *B. lanata*.

Leaves glabrous above .. .. 6. *B. acutifolia*.

Calyx-lobes glabrous:—

Leaves arachnoid above; corolla white with pink mouth .. 4. *B. elegans*.

Leaves glabrous above:—

Corolla pale lilac .. .. 7. *B. divaricata*.

Corolla white .. .. 9. *B. parviflora*.

#### DOUBTFUL SPECIES.

10. *B. patens*.

11. *B. glabra*.

12. *B. ferruginea*.

1. *BÆA PANICULATA*, Ridley in Journ. Linn. Soc. XXXII. 519 (1895). *Stem*-base woody, 4 in. or more long, ·5 in. thick; above a rosette of leaves; upper part of stem 1 ft. or more long, stout, deeply grooved, white-arachnoid; branches numerous, whorled, erect, 6 in. long, covered with brown wool. *Leaves* crowded in a rosette at the top of the woody portion of the stem, lanceolate acuminate, narrowed for a long distance at the base; 6 in. long, 1 in. wide; above grey arachnoid, beneath greyish-white with cinnamon-coloured raised nerves. *Flowers* numerous; pedicels ·5 in. long; bracts 4 or 5 at each whorl of branches, leafy. *Calyx*-lobes short, lanceolate, pubescent, ·125 in. long. *Corolla*-tube very short; limb 1·5 in. wide, blue; lobes large, rounded, unequal. *Filaments* short and thick, ·25 in. long. *Style* curved, as long as stamens. *Capsule* ·75 in. long, thick. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 72

SELANGOR: limestone rocks, Kuala Lumpur, Kelsall and Ridley 1970, 1976 and 8226. PERAK: Sungei Siput, Curtis 3105; Kuala Dipang, King's Collector 8271; Batu Kuran, Scortechini 1611. A superb plant growing in the cracks of limestone rocks.

2. *BÆA VERTICILLATA*, Ridley in Journ. Linn. Soc. XXXII. 519 (1895). *Stem*-base woody, 3 in. or more long, nearly ·25 in. in diameter; above herbaceous, 1·5 ft. tall, 4-angled, white-arachnoid with branches whorled, each whorl 3 in. or less apart. *Leaves* whorled, lanceolate acuminate, narrowed at the base into a petiole; 4 in. long, ·75 in. wide or more;

above grey-arachnoid, beneath white-arachnoid with raised nerves. *Flowers* numerous, blue; bracts leafy, .25 to .5 in. long. *Calyx*-lobes lanceolate subulate, arachnoid, .125 in. long. *Corolla* .5 in. wide; lobes rounded. *Stamens* very short; anthers pear-shaped. *Style* much longer than stamens, straight. Capsule fusiform, acuminate, .5 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 73.

SELANGOR: limestone rocks at Kuala Lumpur, *Kelsall*, *Ridley* 1975, 8551.

3. *BÆA CÆRULESCENS*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 73 (1905). Whole plant over 2 ft. tall; upper part of stem stout, grooved, woolly. *Leaves* oblanceolate, subobtuse, narrowed to the base; above dark green, densely pubescent, beneath ochreous covered with felted wool; 6 to 8 in. long, 1.25 to 2 in. wide; petiole winged to the base or not. *Panicle* 2 ft. or more long, large; branches whorled, yellow-woolly; bracts below leaf-like, above linear, narrow, yellow. *Calyx*-lobes lanceolate, woolly. *Corolla*-tube very short; limb .75 in. across, pale blue, upper lobe shorter; lobes rounded; lower lip unequally lobed, longer, central lobe longest. *Stamens* 2; anthers reniform, conic, large; filaments short, curved. *Style* bent on the cylindric ovary, pubescent; stigma large, discoid. *Capsule* thick, glabrous, .75 in. long.

PERAK: Sungei Siput, *Curtis* 3137; Kinta, *King's Collector* 7175, 7062, 8276.

4. *BÆA ELEGANS*, Ridley in Journ. Linn. Soc. XXXII. 522 (1895). *Stem* about 6 in. long, woody, decumbent, .125 in. thick, arachnoid. *Leaves* whorled in threes, .5 to 3 in. apart, lanceolate acute, narrowed to the base; 1 to 2.5 in. long, .25 to .5 in. wide; above grey-arachnoid, beneath cinnamon-arachnoid. *Peduncles* from the upper axils, slender, glabrous, 6 in. long; cyme terminal, 3 in. long, with few slender branches. *Calyx* very short; lobes lanceolate, glabrous. *Corolla* .5 in. across, with broad rounded lobes, white-pink in the mouth. *Anthers* oblong. *Style* rather short; stigma clubbed. *Capsule* 1 in. long, glabrous, linear, acuminate. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 74.

KEDAH: Gunong Jerai on granite precipices, *Ridley*.

5. *BÆA LANATA*, Ridley in Journ. Linn. Soc. XXXII. 520 (1895). *Stem* short, stout, woody, 2 in. long, curved, with white wool. *Leaves* crowded, lanceolate acuminate, narrowed into the petiole; arachnoid above, densely woolly beneath; 3 in. long, .75 in. wide; petiole woolly, 3 in. long, winged to base. *Panicles* few, branched, axillary, dense, 1 to 5 in. long. *Calyx* as long as the corolla-tube; lobes lanceolate, woolly outside. *Corolla* thin, .5 to .75 in. across, glabrous, rose-pink;

lobes rounded. *Anthers* subglobose. *Style* thick. *Capsule* .5 in. long, thick, glabrous. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 74.

KEDAH: Langkawi, Dayong Bunting, on limestone rocks, *Curtis* 2569.

6. *BÆA ACUTIFOLIA*, Ridley in Journ. Linn. Soc. XXXII. 519 (1895). *Stem* woody, 3 in. or more long, .25 in. through; internodes .5 in. long. *Leaves* crowded at the top, oblanceolate, acute, narrowed to the base; 6 in. long, 1.5 in. wide; above glabrous dotted, beneath cinnamon-arachnoid. *Panicles* axillary, 6 in. long; peduncles arachnoid; branches short, slender. *Calyx*-lobes 3, lanceolate, acute, .125 in. long, arachnoid. *Capsule* cylindric, acute, glabrous, .75 in. long. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 75.

KEDAH: Langkawi, Goa Chinta, *Curtis* 2791.

7. *BÆA DIVARICATA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 75 (1905). *Stem* about 4 in. tall, thick and woody. *Leaves* in a rosette on the top, oblanceolate, crenulate, obtuse, narrowed into a winged petiole; nerves and nervules beneath elevated, 15 pairs; above glabrous, beneath covered with a thin brownish tomentum; 7 in. long, 2.5 in. wide. *Peduncles* rather stout, terete, smooth, 7 to 16 in. tall; branches umbellate, decompound, 1 ft. or more long; pedicels of flowers .2 in. long, covered with brown fur. *Calyx*-lobes lanceolate, acute, green, glabrous, shorter than the corolla-tube. *Corolla* .25 in. across, pale lilac; tube short, dilated; limb bilabiate, lobes rounded. *Stamens*: anthers connate, rounded with acute bases; filaments thick, sigmoid. *Style* slender; stigma horseshoe-shaped. *Capsule* cylindric, strongly twisted, 1 in. long.

KEDAH: Lankawi, Ayer Hangat, *Curtis* 3683.

8. *BÆA SUFFRUTICOSA*, Ridley in Journ. Linn. Soc. XXXII. 518 (1895). A branching shrub, 1 to 2 ft. tall, with rather slender branches .125 in. through, angled, slightly arachnoid. *Leaves* scattered, lanceolate, subacute, narrowed at the base; 3 in. long, .5 in. wide; above nearly glabrous, punctate, beneath covered with brownish tomentum; nerves conspicuous; petiole .25 to .5 in. long. *Panicles* axillary, dense, 1 in. long, with short branches brownish-woolly; buds brown-woolly. *Calyx* longer than the corolla-tube; lobes linear, lanceolate, thick, tomentose outside. *Corolla* .25 to .35 in. across, white; lobes short, oblong, rounded. *Anthers* oblong, obtuse. *Capsule* fusiform, very thick, .25 in. long, tipped with the long style. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 76.

KEDAH: Langkawi, on a small island north of Kwah, *Curtis* 3682, 2565.

9. *BÆA PARVIFLORA*, Ridley in Journ. Str. Br. R. As. Soc. No. 43,

76 (1905). *Stem* slender, shrubby, branching, covered with ferruginous tomentum. *Leaves* lanceolate, acuminate; base cuneate, unequal; 4 in. long, 1 to 1·25 in. wide; above glabrous, beneath covered with rusty wool; nerves elevated, 11 pair. *Peduncle* 6 in. long, slender, glabrous; panicle umbellate, of 6 slender branches in a terminal whorl; branchlets glabrous, numerous, slender; bracts very narrow, linear; flowers very small, numerous, white; pedicels slender, ·125 in. *Calyx*-lobes lanceolate, glabrous, 5. *Corolla* very small, white; tube very short; upper lobes subacute, lower ones oblong. *Anthers* large, reniform. *Style* shorter than anthers. *Capsule* very slender, cylindric, ·25 in. long, terminated by the slender style.

PERAK: Hot Springs at Ipoh and Sungei Siput, not common, *Curtis* 3134; Kinta, *King's Collector* 7108. On limestone rocks.

#### DOUBTFUL SPECIES.

10. *BÆA PATENS*, Ridley in Journ. Linn. Soc. XXXII. 520 (1895). Almost stemless. *Leaves* rosulate, oblong, obtuse, serrulate-crenulate, inæquilateral; 4 to 6 in. long, 2 to 3 in. broad; upper surface softly pubescent, lower pale ferruginous-tomentose; petiole 1 in. long. *Peduncle* stout, terete, 18 in. long, softly ferruginous-lanate; branches long, divaricate, 2-forked; primary bracts oblong, ·25 in. long, secondary smaller; cymules scorpioid, few-flowered; flowers small, white, ·125 in. broad; pedicels ·06 in. long. *Calyx*-lobes free to the base, short, lanceolate, acute, glabrous. *Corolla* campanulate, glabrous; lobes 2 oblong-obtuse, 3 ovate-obtuse, shorter and broader. *Stamens* with short slender curved filaments as long as tube; anthers large, oblong. *Pistil* glabrous; ovary cylindric, attenuated into a slender little-exsert style; stigma small, scarcely dilated. *Capsule* ·5 in. long, glabrous, very slender.

SIAMESE STATES: Pungah, *Curtis*.

11. *BÆA GLABRA*, Ridley in Journ. Linn. Soc. XXXII. 521 (1895). A succulent, glabrous herb; stem short, 1 to 2 in. long. *Leaves* undulate, ovate-rotundate, inæquilateral, 6 in. long, 3·5 in. broad or broader; petiole 1 to 2 in. long, thick; upper leaves smaller, opposite. *Peduncles* subterminal, 3 to 4 in. long, thick; cymes terminal, congested, scorpioid, ·5 in. long; pedicels short. *Calyx*-tube short, conical; lobes 5, equal, obcuneate, truncate, ·125 in. long. *Corolla* white, ·5 in. broad; lobes rounded, obtuse. *Stamens* 2; filaments sigmoid, broad at the base, attenuate above; anthers oblong, acute on both sides, rather large. *Style* cylindric, thick, glabrous, curved; stigma scarcely thickened, obliquely ovate.

SIAMESE STATES: Pungah, *Curtis* 3039.

12. *BÆA FERRUGINEA*, Ridley in Journ. Linn. Soc. XXXII. 521 (1895). Stemless or with a short thick stem; roots large and thick. *Leaves* many, congested, spreading, ovate, cordate, obtuse, crenulate; upper surface clothed with sparse hairs, lower green, paler, tomentose, the raised nerves clothed with long hairs; when dry somewhat black above, ferruginous-tomentose beneath; blade 3 in. long, 2·5 in. broad; petiole 1·5 to 2 in. long. *Peduncles* 3 in. long, ferruginous-tomentose; cyme scorpioid, ferruginous-hispid. *Calyx*-lobes linear-lanceolate, as long as the corolla, green, ferruginous-hispid. *Corolla* ·3 to ·5 in. broad, white or pink, spreading; lobes broad, equal, obovate-obtuse; tube very short. *Stamens* 2, short; filaments broad, spatulate, 3-toothed at apex; anthers yellow, conical, cuneate at the tips. *Ovary* conical, attenuate in a short, curved, cylindric, narrowed style; stigma rather broader, flat, entire.

KEDAH: Langkawi Island, on damp rocks, *Curtis* 2566.

Ridley remarks that, not having seen the fruit, he is uncertain as to the genus.

#### 10. *PHYLLOBÆA*, Benth.

Herbs or half-shrubby plants. *Leaves* opposite, petioled. *Cymes* pedunculate, many-flowered; bracts large, conspicuous; flowers large, pink or blue. *Calyx* large, 2-lipped; one lip 2-lobed, the other 3-lobed or of 3 large connate sepals. *Corolla* broadly campanulate, 2-lipped, 3- to 5-lobed. *Stamens* 2, short; anthers large, rounded. *Capsule* lanceolate, at length twisted.—*DISTRIB.* Species 2, one Burmese, one Malayan.

*PHYLLOBÆA SPECIOSA*, Ridley in Journ. Linn. Soc. XXXII. 522 (1895). A shrub, 1 or 2 ft. tall; stems white-tomentose. *Leaves* in distant pairs, lanceolate-acuminate, 6 in. long, 1·5 in. wide; above glabrous, beneath white-arachnoid; petiole 1 in. long. *Peduncle* stout, lateral, erect, nearly a foot tall; flowers sessile, scattered; bracts ovate, lanceolate, ·5 in. long, white-arachnoid. *Calyx* of 3 sepals, connate, ovate, oblong, woolly, ·4 in. long. *Corolla* 1 in. long, blue; tube broad; lobes 3, two oblong-truncate, the third much broader. *Stamens* short, not longer than the ovary. *Style* long, woolly. *Capsule* 1 in. long, lanceolate, cylindric, acuminate, woolly.

KEDAH: Langkawi, common on limestone rocks on the small islands, *Curtis* 2564.

#### 11. *BÆICA*, Clarke.

Herbs or half-shrubby plants with the habit of *Bæa*. *Leaves* oblong, elliptic or lanceolate, more or less tomentose or hairy. *Inflor-escence* racemose or paniced, axillary; flowers small, lilac or white. *Calyx* 5-fid. *Corolla*-tube very short; lobes subequal, rounded. *Sta-*

*mens* 4; filaments very short; anthers rounded, connivent. *Style* curved, larger than the stamens. *Capsule* linear cylindric.—DISTRIB. Species 4 or 5, in Assam, Burma, and the Malay Peninsula.

Ridley says: "Most of the few described species are based on flowerless specimens, and are all very similar and closely resemble *Baa divaricata* in habit, but the capsule is straight and not twisted. The type-species, however (*B. filiformis*, Clarke), has 4 stamens instead of 2. The Malayan one described below differs from these in habit, and I have seen no fruit, but there is no other genus to which it can be referred on account of its 4 very short stamens arranged in a circle round the pistil. The only other genus allied to it is *Platystemma*, a Himalayan plant with distinctly 2-lipped flowers."

BÆICA BRACHYANDRA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 78 (1905). Stemless. *Leaves* obovate, serrate, hairy, dark green, obtuse; 3 in. long by 1·5 in. wide; nerves 6 or 7 pair; covered beneath with long red hairs; back of leaf punctate. *Scape* short, few-flowered, about 3 in. long, hairy, unbranched. *Calyx*-lobes free nearly to base, linear, hairy, green, nearly as long as corolla-lobes. *Corolla*-tube very short; lobes broad, rounded, oblong, explanate, subequal, pale lilac, about ·5 in. across. *Stamens* 4; filaments very short; anthers broad, waxy, subglobose, connivent round the pistil. *Style* longer than stamens, slender, curved, white. *Capsule* cylindric, narrow, 1 in. long, scabrid, straight, on pedicels elongated to ·5 in.

KEDAH: Langkawi, Gunong Chinchang, at Kwala Malacca, Curtis.

Ridley says this plant was found quite dried up in February, 1899, but was brought in alive and flowered in the Botanic Gardens, Penang.

## 12. ORCHADOCARPA, Ridley.

Herb or shrublet, with opposite unequal leaves. *Flowers* small, blue, racemose or cymose, pedicelled. *Calyx*-lobes free to base, narrow-lanceolate. *Corolla*-tube short; limb 2-lipped unequally. *Stamens* 2; filaments short, exsert, sinuate, glabrous; anthers bilobed, reniform, connivent by their edges. *Ovary* hairy, oblong; style short; stigma capitate. *Capsule* oblong, hairy, enclosed in the sepals.—DISTRIB. One species, Malayan.

ORCHADOCARPA LILACINA, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 78 (1905). *Stem* short to 4 in. long, stout, woody. *Leaves* crowded at the top, long-petioled, thin, ovate or ovate-lanceolate, acute, strongly serrate, covered with closely-felted short hairs; base broad, in-æquilateral; 3 to 7 in. long, 1·5 to 3 in. wide; petiole slender, 3 to 6 in. long. *Peduncle* 3 to 4 in. long, pubescent, villous, bearing a terminal, pubescent, umbelliform panicle, or simply racemose. *Calyx*-lobes linear, pubescent, 1 to 2 in. long. *Corolla* pale lilac-blue; tube very short; limb dis-

tinctly bilabiate, upper lip smaller lobes short rounded, lower lip longer, trifid; median lobe longer than the others, oblong-obtuse, pubescent across. *Stamens* 2; filaments from the mouth of the corolla-tube, thick, twisted at the top; anthers large, reniform. *Ovary* oblong, pubescent; style distinct; stigma very small, capitate. *Capsule* short, oblong, hairy, enclosed in the calyx, beaked.

PERAK: *Scortechini* 406; Gunong Batu Putih, *Wray* 298, 302.

### 13. LEPADANTHUS, Ridley, n. gen.

Herb with fistular stem. *Leaves* opposite, petioled, ovate, toothed. *Flowers* in axillary or terminal, flexuose, distichous racemes. *Calyx*-lobes free nearly to the base, ovate acute. *Corolla* as long as calyx, bilabiate; upper lobe much the shorter. *Stamens* 2 fertile; anthers elliptic. *Ovary* elliptic; style long; stigma oblique, entire. *Capsule* as long as calyx-lobes, loculicidal; placentæ thick, elevated. *Seeds* very minute, warted.—DISTRIB. One species.

The plant on which the genus is founded has the habit of *Rhyncotecom*, but the fruit is capsular.

[LEPADANTHUS, Ridley, gen. nov. Herbacea, caule fistuloso. *Folia* opposita, petiolata, ovata, dentata. *Flores* distichi in racemis axillaribus vel terminalibus flexuosis. *Calycis* lobi fere ad basin liberi, ovati, acuti. *Corolla* calyci æqualis, bilabiata, labio superiore multo brevior. *Stamina* 2 fertilia; antheræ ellipticæ. *Ovarium* ellipticum, stylo longo, stigmate obliquo, integro. *Capsula* calycis lobis æquilonga, loculicida, placentis crassis elevatis. *Semina* minutissima, verrucosa.]

LEPADANTHUS FLEXUOSA, Ridley, n. sp. A herb, reaching 18 in. in height; stem hairy, fistular. *Leaves* very thin when dry; ovate, sub-acute, rounded and slightly unequal at base, strongly toothed; 5 in. long, 4 in. wide; nerves about 8 to 10 pair, hairy; petiole slender, 3 to 4 in. long. *Racemes* several, pubescent, 3 to 4 in. long, including the 1 to 1.5 in. long peduncle; rachis flexuose with distant alternate flowers on capillary secund pedicels .5 in. long; bracts in pairs, linear, deflexed, .125 in. long. *Calyx*-lobes 5, ovate, acuminate, pubescent, 3-nerved. *Corolla* small; tube short, thick; upper lip bifid, much shorter than the lower, glabrous. *Stamens* 2; filaments extremely short, adnate to the corolla-tube; anthers elliptic. *Ovary* elliptic; style pubescent, as long as calyx-lobes or longer; stigma clavate, oblique. *Capsule* .25 in. long, oblong, glabrous. *Seeds* elliptic, dark red.

KEDAH: inside the caves, Gunong Grenong, *Fox* 3811 (a poor specimen only).



[*L. FLEXUOSA*, Ridley, sp. nov. Herba pubescens caule 40–50 cm. alto fistuloso. *Folia* siccitate tenuissima, ovata, subacuta, rotundata, ad basin parum inæqualia, dentata; 12 cm. longa, 10 cm. lata; nervi utrinque 8–10, pubescentes; petiolus gracilis, 7–10 cm. longus. *Racemi* plures, pubescentes, cum pedunculo 7–10 cm. longi; rhachis flexuosa, floribus alternis distantibus, pedicellis secundis capillaribus; bractee geminae lineares deflexae, 3 mm. longae. *Calycis* lobi 5, ovati, acuminati, pubescentes, trinervi. *Corolla* parva, tubo brevi crasso; labium superius bifidus, inferiori multo brevius. *Stamina* 2; filamenta brevissima, tubo corollae adnata. *Ovarium* ellipticum; stylus pubescens, calycis lobis æquilongus vel longior; stigma clavatum, obliquum. *Capsula* 6–7 mm. longa, oblonga, glabra. *Semina* elliptica nigro-rubra.

PENINSULA MALAYANA: in Prov. Kedah in specubus ad Gunong Grenong.]

#### 14. RHYNCHOGLOSSUM, Blume.

Herbs, succulent and nearly glabrous. *Leaves* opposite, thin. *Raceme* terminal, lax; flowers pendent. *Calyx* campanulate, toothed or lobed. *Corolla*-tube cylindric, narrowed above; limb bilobed; upper lobe very short bifid, lower much longer, 3-lobed. *Stamens* 2 perfect, affixed to the middle of the corolla-tube; anthers connivent; cells ellipsoid, parallel; staminodes 2, or absent. *Disk* cylindric. *Ovary* ovoid, glabrous; style longer; stigma dilate. *Capsule* included in the calyx, ellipsoid, membranous, 2-valved. *Seeds* narrowly ellipsoid, smooth.—DISTRIB. Species 2, in India, Malaya and the Philippines.

RHYNCHOGLOSSUM OBLIQUUM, Blume Bijdr. 741 (1826). Succulent herb, 20 in. tall. *Leaves* 1 to 3 in long, .5 to 1 in. wide; glabrous or nearly so, ovate-acuminate; petiole .5 in. long or less. *Racemes* lax, about 6 in. long; flowers numerous, pale to deep violet; bracteoles filiform, .1 to .2 in. long. *Calyx* tubular, .25 in. long, enlarged in fruit; lobes triangular or lanceolate. *Corolla* .6 in. long; lower lip several times longer than the upper one, subtrilobed. *Capsule* ellipsoid, .3 in. long. DC. Prodr. IX. 274; Clarke in DC. Monog. Phan. V. 161, in Comm. & Cyrt. Beng. t. 88, and in Hook. f. Fl. Br. Ind. IV. 367; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 79. *R. Blumei*, DC. Prodr. IX. 274. *Wulfenia intermedia*, Wall. Cat. 408. *Loxotis intermedia*, Benth. Scroph. Ind. 57; G. Don Gen. Syst. Dichl. Pl. IV. 664. *L. obliqua*, R. Br. in Benn. Pl. Jav. Rar. 102, t. 24; Miq. Fl. Ind. Bat. II. 731, t. 35, fig. 3.

PERAK: Larut Hills, *Fox*; Batang Padang, *Wray* 1447, at 2000 ft. elevation.—DISTRIB. Tenasserim and Malay Islands.

#### 15. EPITHEMA, Blume.

Small rock-herbs, succulent, pubescent; stems simple or branched. *Leaves* few, alternate or opposite above, petioled or sessile; ovate, usually cordate. *Peduncles* long, from the upper axils, erect; bract

single, ovate or cucullate; flowers small, blue or white, in a scorpioid cyme on short pedicels. *Calyx* campanulate; lobes 5, acute. *Corolla*-tube short; limb distinctly 2-lipped; lobes acute or obtuse, subequal. *Stamens*: 2 posterior perfect, 2 anterior ones sterile, shorter; anthers coherent. *Disk* unilateral or almost surrounding the ovary. *Ovary* ovoid; style longer; stigma subcapitate. *Capsule* globose, enclosed in the enlarged calyx on a thickened and a longer pedicel, splitting transversely (a pyxis). *Seeds* ellipsoid or oblong, spirally reticulate.—**DISTRIB.** Species about 6 Asiatic, all very closely allied, and one African.

**EPITHEMA SAXATILE**, Blume Bijdr. 738 (1826). Succulent herb, 3 to 12 in. tall; stem viscid, pubescent. *Leaves* very variable, opposite, ovate cordate, denticulate or crenulate, hairy; 1·5 to 6 in. long, 1 to 5 in. across; petiole ·25 to 1·5 in. long. *Peduncle* 1 to 2 in. long, viscid; cyme ·75 in. across, subtended by a broad sessile truncate denticulate bract; flowers numerous, subsessile. *Calyx* viscid, pubescent, tubular, split about half-way down into 5 narrow lobes ·25 in. long. *Corolla*-tube as long, straight, white; three upper lobes oblong, obtuse, tipped with violet; lower two connate, broader, subovate, denticulate, thinner, pellucid, tipped mauve with darker central spots; mouth of tube inside hairy. *Stamens* 4, in 2 pairs; filaments incurved, adnate to the mouth of the tube, white; anthers 2, oblong, connate, yellowish. *Ovary* ovoid, enclosed in a fleshy truncate yellow disk; style stout, glabrous; stigma capitate. *Capsule* globose, pubescent, surrounded by the much enlarged ovate acute sepals and borne on the thickened elongate to ·125 in. pedicel, circumsciss. *Seeds* very numerous, brown, elliptic, fusiform, spirally ribbed. DC. Prodr. IX. 278; Miq. Fl. Ind. Bat. II. 736; Zoll. Verz. Ind. Archip. 55; Clarke in DC. Monog. Phan. V. 178; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 80.

**KEDAH**: Langkawi Islands, *Curtis* 2107. **PERAK**: Telor Pinang Ipoh, *Ridley*; Batu Kuran, *Scortechini* 1580; *King's Collector* 10941; Sungei Ryah, *Kunstler* 283; Goping, *King's Collector* 5872. **SELANGOR**: Kuala Lumpur Caves, *Ridley* 8217. **PAHANG**: Kota Glanggi, *Ridley*. —**DISTRIB.** Java, Borneo, Sumatra. On limestone rocks.

## 16. MONOPHYLLÆA, R. Br.

Succulent herbs with an unbranched stem and one large herbaceous cordate-ovate sessile leaf. *Peduncles* numerous, from the leaf-base, with racemose or cymose inflorescence; flowers small. *Calyx* deeply 5-cleft; lobes elliptic, obtuse. *Corolla* small, usually white; tube short, cylindrical; limb distinctly 2-lipped, lobes 5. *Stamens* 4 perfect; filaments

short; anthers cohering in pairs or altogether. *Disk* unilateral or a complete ring. *Ovary* 1-locular; style short; stigma capitate. *Capsule* membranous, enclosed in the enlarged calyx, irregularly splitting. *Seeds* oblong, minute, reticulate.—**DISTRIB.** Species 7, of the Malay Peninsula and Islands, and Siam.

Leaf glabrous; calyx-lobes not spreading in fruit

Calyx-lobes ovate, rounded; flowers white .. 1. *M. Horsfieldii*.

Calyx-lobes lanceolate, acute; flowers white and brown .. 2. *M. glabra*.

Leaf strigosely hairy; calyx-lobes spreading in fruit .. 3. *M. patens*.

1. **MONOPHYLLÆA HORSFIELDII**, R. Br. in Benn. Pl. Jav. Rar. 121 (1840), and Ann. Sc. Nat. 2, XIII. 160. *Stem* 6 in. to 1 ft. tall. *Leaf* ovate-cordate, 6 to 12 in. long, 1 to 12 in. wide; glabrous, glaucous beneath. *Racemes* 2 to 7, often stout, 9 in. long; flowers numerous, subsecund; pedicels .25 in. long, glabrous. *Calyx*-lobes glabrous, rounded, ovate, ribbed. *Corolla*-tube short, cylindric; upper lip 2-lobed, lower 3-lobed; lobes rounded, white. *Stamens* 4, didynamous, glabrous; anthers connate. *Style* short, glabrous; pistil subglobose. *Capsule* globose, enclosed in the enlarged calyx-lobes. *Seeds* oblong, brown, reticulate, very numerous. DC. Prodr. IX. 274; Miq. Fl. Ind. Bat. II. 731; Clarke in DC. Monog. Phan. V. 182, and in Hook. f. Fl. Br. Ind. IV. 370; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 82.

**SELANGOR:** Kuala Lumpur Caves, *Curtis*; *Beccari*. **PERAK:** Goping, *King's Collector* 443, 515.—**DISTRIB.** Sumatra: Batu Pantih (*Forbes* 2660); Java (*Lobb*). On limestone rocks.

2. **MONOPHYLLÆA GLABRA**, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 82 (1905). *Stem* succulent, 6 in. to 1 ft. tall. *Leaf* ovate-cordate, obtuse, glabrous; glaucous beneath; 2.5 to 6 in. long, 2 to 6 in. wide. *Racemes* slender, glabrous, 4 to 10, 2 to 8 in. long, lax; flowers numerous, in pairs; pedicels slender, .25 in. long, spreading, deflexed. *Calyx*-lobes .125 in. long in fruit, lanceolate, acute, glabrous, not spreading. *Corolla* brown and white. *Capsule* enclosed in the sepals, cylindric, oblong.

**SIAMESE STATES:** Kasúm, *Curtis* 3219.

3. **MONOPHYLLÆA PATENS**, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 82 (1905). *Stem* 1 to 4 in. long, viscid-hairy. *Leaf* ovate-cordate to ovate-lanceolate, strigose, hairy; 6 in. long, 4 to 6 in. across. *Racemes* slender, 4 to 20, pubescent, 4 to 5 in. long; flowers in pairs; pedicels slender, pubescent, .25 in. long in fruit. *Calyx*-lobes lanceolate, hairy, spreading in a stellate manner in fruit, ribbed. *Corolla*-tube short; lobes white. *Stamens* 4, glabrous, didy-

namous. Ovary ovoid; style short, thick, **glabrous**. Capsule globose, glabrous. Seeds numerous, black, tessellated.

SELANGOR: Kuala Lumpur Caves, *Ridley* 8222; *King's Collector* 7052. PERAK: Kinta, *Curtis* 3136; Sungei Siput, *Curtis* 3135; Batu Kuran, *Scortechini* 1574, 1579; Goping, *Kunstler* 449. On limestone rocks.

### 17. STAURANTHERA, Benth.

Herbs, succulent, pubescent. Leaves alternate, the opposite ones reduced, falcate, elliptic, acuminate, inæquilateral. Cymes peduncled, lax; bracts small; flowers medium-sized, showy. Calyx campanulate; lobes 5. Corolla campanulate, rounded; tube short, shortly spurred or gibbous; limb 2-lipped; lobes rounded, nearly equal. Stamens 4 perfect; anthers connate, bilocular, bases diverging. Ovary subglobose or ovoid, no disk; style short. Capsule depressed, globose, irregularly split. Seeds minute, obovoid-reticulate.—DISTRIB. Species 3. Assam and Malay Islands.

Flowers large, base of corolla spurred ..	..	.. 1. <i>S. grandiflora</i> .
Flowers small, base of corolla not spurred ..	..	.. 2. <i>S. umbrosa</i> .

1. STAURANTHERA GRANDIFLORA, Benth. Scroph. Ind. 57 (1835). Succulent herb with a fleshy stem about 6 in. tall. Leaves 6 in. long by 4 in. wide or less; oblong, obtuse, crenulate; deep green above, bullate, glabrous, inæquilateral, pubescent on both sides; petiole 1 in. long. Cyme short, pubescent, 3 in. long, with a few (9) large flowers; bracts short, ovate; flowers 1.25 in. across. Calyx-lobes lanceolate, ovate, pubescent. Corolla-tube short and broad, with a short spur at the base; lobes short, broad, rounded, violet with a central yellow bar reaching to the spur. Stamens subequal, 4; filaments slender; anthers connate. Ovary ovoid; style shorter than the stamens; stigma capitate. Capsule 2 in. broad. Clarke in DC. Monog. Phan. V. 190, and in Hook. f. Fl. Br. Ind. IV. 371; G. Don Gen. Syst. Dichl. Pl. IV. 665. *S. grandifolia*, Dict. Syn. Pl. III. 582; R. Br. in Benn. Pl. Jav. Rar. 121, and Ann. Sc. Nat. 2, XIII. 167; DC. Prodr. IX. 278; Hook. Bot. Mag. t. 5409; Floral Mag. Ser 1 (1866), t. 272; Miq. Fl. Ind. Bat. II. 735; Clarke Comm. & Cyrt. Beng. t. 89 bis; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 83. *Glossanthus* ? *grandiflora*, Benth. in Wall. Cat. 6395.

PENANG: Wallich 6395; rocks near Balik Pulau, *Curtis*. PERAK: Larút, *King's Collector* 2248.—DISTRIB. Burma. Rare, on rocks.

2. STAURANTHERA UMBROSA, Clarke in Comm. & Cyrt. Beng. t. 89 (1874). Stem 3 to 6 in. tall. Leaves ovate, oblong, falcate, inæquilateral, strigosely hairy especially beneath; 6 to 8 in. long, 2 to 4

in. wide. *Cymes* spreading, few- to 10-flowered; peduncles and pedicels hairy. *Calyx* shortly 5-lobed, cup-shaped; lobes triangular, .25 in. long in flower, larger and spreading in fruit. *Corolla* .5 in. long, white with a violet spot in the centre. *Ovary* unilocular. *Capsule* circumsciss near the base. Clarke in DC. Monog. Phan. V. 189, and in Hook. f. Fl. Br. Ind. IV. 731; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 83. *Cyananthus umbrosa*, Griff. Notul. IV. 154; Ic. Pl. Asiat. t. 437.

PERAK: Telok Pinang, near Ipoh, *Ridley* 9773; Kinta, *King's Collector* 7144. SELANGOR: woods at the Kuala Lumpur Caves, *Ridley* 8224. PAHANG: Tahan Woods, *Ridley* 2183. JOHORE: Gunung Panti, *Ridley* 4166.—DISTRIB. ASSAM. A ground plant in damp rocky woods.

### 18. RHYNCHOTECUM, Blume.

Shrubs, little branched, young parts red-woolly. *Leaves* opposite or alternate. *Cymes* axillary, decompound; flowers small, numerous. *Calyx* 5-cleft nearly to the base; lobes narrow. *Corolla* small, campanulate; limb 2-lipped; lobes 5, ovate or oblong, subequal. *Stamens* 4 perfect, affixed to near the corolla base; filaments short, curved; anther-cells 2, subparallel. *Ovary* sessile, ovoid; disk very small, annular or absent; style much longer than ovary; stigma subcapitate. *Berry* small, globose, with persistent style; pericarp pulpy. *Seeds* very small, smooth.—DISTRIB. Species 9, Indo-Malayan.

RHYNCHOTECUM PARVIFLORUM, Blume Bijdr. 775 (1826). A little-branched shrub about 3 ft. tall, leafy above, upper parts ferruginous-hairy. *Leaves* opposite, lanceolate, acute, cuneate at the base, serrate; 8 in. long, 3.5 in. wide; dark green, glabrous above except the midrib, covered with red wool beneath, thickest on the nerves; nerves 13 pairs; petiole 1 in. long. *Cymes* numerous, short, from the lower part of the stem, laxly branched, red-woolly; flowers very small, yellowish-white. *Calyx*-lobes nearly free to the base, linear-lanceolate, acute, woolly, .125 in. long. *Corolla* little longer than the calyx-lobes, campanulate; lobes oblong, obtuse, white. *Stamens* 4, very short; filaments short and thick. *Style* longer than the ovary. *Capsule* ovoid-globose, hairy, shorter than the sepals. G. Don Gen. Syst. Dichl. Pl. IV. 663; Dietr. Syn. Pl. III. 581; DC. Prodr. IX. 285; Zoll. Verz. Ind. Archip. (1854) 55; Miq. Fl. Ind. Bat. II. 750; Clarke in DC. Monog. Phan. V. i. 195, and in Hook. f. Fl. Br. Ind. IV. 373; Ridley in Journ. Linn. Soc. XXXII. 523, and in Journ. Str. Br. R. As. Soc. No. 43, 84. *Isanthera parviflora*, Ridley in Trans. Linn. Soc. Ser. 2, III. 331.

PENANG: *Wallich*; Pulau Betong and Penara Bukit, *Curtis* 3035;

PERAK: Larút Hills, *Ridley*; *King's Collector* 2237; *Scortechini* 1222.  
PAHANG: Kuala Tahan, *Ridley* 2171.—DISTRIB. Java, Sumatra.

### 19. CYRTANDROMCEA, Zoll.

Shrubs with square stems, leafy above. *Leaves* opposite, subequal, herbaceous, ovate elliptic or lanceolate, serrate, petioled. *Flowers* 1 to many, in axillary or basal cymes; bracts 2 in the middle of the pedicel. *Calyx* tubular, shortly 5-toothed or lobed, enlarged in fruit, usually red. *Corolla* large, white, tubular, thin, glabrous; tube dilated at apex; lobes rounded, subequal. *Stamens* 4 perfect, in 2 pairs, subsimilar; filaments linear; anthers ovoid, small. *Pistil* longer than stamens; stigma cup-shaped. *Capsule* globose or oblong, enclosed in the enlarged calyx, opening irregularly; walls membranous. *Seeds* numerous, sinuate, oblong, obtuse, ribbed, reticulate.—DISTRIB. Species 10, Malayan.

Flowers solitary, axillary; corolla nearly 1 in. long ..	..	1. <i>C. acuminata</i> .
Flowers in lax many-flowered cymes:—		
Cymes slightly supra-axillary; corolla about 2 in. long ..	..	2. <i>C. megaphylla</i> .
Cymes borne on base of stem or on upper portion below the leaves; corolla 1 in. long ..	.. ..	3. <i>C. grandis</i> .

1. CYRTANDROMCEA ACUMINATA, Benth. and Hook. f. Gen. Pl. II. 1020 (1876). A shrubby plant, 3 to 4 ft. long; stem rather weak, hollow, young parts pubescent. *Leaves* lanceolate or ovate, narrowed into the petiole, acute, serrate, strigose, pubescent above, also on the nerves beneath; 4 to 6 in. long, 2 to 3 in. wide; petiole 1 in. long. *Flowers* solitary, axillary, on short .125 in. long, lanceolate, slender, hispid peduncles with 2 very small linear bracts in the middle. *Calyx* tubular, .5 in. long, glabrous, with short teeth, dull red. *Corolla* nearly straight, 1 in. long; tube thick; lobes rounded, white. *Capsule* oblong, 4-angled, .25 in. long. *Seeds* minute, deeply reticulate. Clarke in DC. Monog. Phan. V. i. 185, and in Hook. f. Fl. Br. Ind. IV. 370; *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 86. *Cyrtandra?* *acuminata*, Wall. Cat. 1808. *Busea subsessilis*, Miq. Fl. Ind. Bat. II. 733.

TRINGGANU: Bundi, *Rostado*; PENANG: *Porter* in *Wallich's Collector*, 808; *Maingay* (K.D.) 1232-2; *King*; Tonoh, *Machado*. PERAK: Larút Hills, *Ridley* 2917; *Scortechini* 83, 329; *King's Collector* 5342, 2139. SELANGOR: Ginting Bidai, *Ridley*. NEGRI SEMBILAN: Bukit Sulu, *Cantley*.

2. CYRTANDROMCEA MEGAPHYLLA, Hemsley in Hook. Ic. Pl. t. 1555 (1884). Herb about 3 ft. tall; stem bluntly 4-angled, pithy in the centre, pubescent. *Leaves* opposite, subequal, herbaceous, ovate,

acutely acuminate, coarsely serrate, base rounded or subcordate; 6 to 10 in. long, 3 in. wide; pubescent; petiole 3 to 5 in. long. *Cymes* from a little above the axils, lax, many-flowered. *Calyx* tubular, pubescent, shortly 5-toothed, .5 in. long, inflated in fruit. *Corolla* about 2 in. long, white, obliquely infundibuliform; lobes rounded, subequal. *Ovary* perfectly bilocular. Ridley in Journ. Linn. Soc. XXXII. 523, and in Journ. Str. Br. R. As. Soc. No. 43, 86.

PERAK: Larút Hills at 2100 ft. alt., Wray; *Scortechini* 584; Gunong Batu Putih, *King's Collector* 8155. SELANGOR: Ginting Peras, *Ridley* 7602.

3. *CYRTANDROMŒA GRANDIS*, Ridley in Journ. Str. Br. R. As. Soc. No. 43, 87 (1905). A large shrub, several feet tall; base of stem woody, .5 in. through, glabrous. *Leaves* opposite, equal, herbaceous, lanceolate acuminate, glabrous, narrowly acuminate at the base; margins dentate; 12 in. long, 4 in. wide; nerves elevated, 10 pairs; petiole 1 to 1.25 in. long. *Cymes* large, lax, borne on the base of the stem, and on the upper part below the leaves, many-flowered, 2.5 to 6 in. long, pubescent; pedicels .25 in. long. *Calyx* tubular, pubescent, with linear lobes, red, .5 in. long. *Corolla* white, 1 in. long; tube straight, thick; lobes rounded. *Capsule* globose, .5 in. long, enclosed in the enlarged calyx. *Seeds* minute, black, oblong, ribbed and reticulate.

PERAK: Ulu Bubong, *King's Collector* 10150; Gunong Batu Putih, *King's Collector* 8155. SELANGOR: Kuala Lumpur, *Curtis*; *Ridley* 10498; 15th mile Pahang Track, *Ridley* 8552; Bukit Hitam, *Ridley* 7576.

## 20. *CYRTANDRA*, Forst.

Half-shrubby plants, terrestrial or rarely epiphytic; stems often branched, usually tall. *Leaves* opposite, subequal or one smaller. *Cymes* axillary, on long or short peduncles, many-flowered; bracts large or small, free or connate; bracteoles ovate or narrowed or absent. *Calyx* tubular, 2- to 6-lobed, usually 5-lobed; lobes lanceolate. *Corolla*-tube short, usually pubescent, infundibular, straight; lobes 5, subequal or more or less distinctly 2-lipped, usually white-spotted or marked with yellow-brown or red. *Stamens* 2, perfect, shortly exsert or included, affixed to the corolla; anthers bilocular, connivent, free or coherent; staminodes small, 2 to 3. *Disk* annular or unilateral. *Ovary* ovoid or oblong; style long, filiform; stigma sub-bilobed. *Berry* sausage-shaped or ovoid, firmly fleshy, usually beaked with the persistent style. *Seeds* numerous, minute, ellipsoid, smooth or obscurely reticulate.—DISTRIB. About 170 species, in the Malay Peninsula and Archipelago eastwards to Polynesia.

Bracts free:—

Leaves of a pair with one usually manifestly smaller than the other, sometimes entirely suppressed, or less frequently (*C. pendula*) reduced to a subulate process opposite the perfect leaf:—

Leaves 12 in. long, their margins strongly toothed especially towards the apex, all quite alternate from suppression of one of each pair; calyx 5-lobed; corolla .5 in. long .. .. 1. *C. dispar*.

Leaves 7 to 9 in. long, their margins entire or occasionally (*C. pendula* sometimes) crenate:—

Bracts ovate acute; leaves with one of each pair usually smaller than the other and sometimes (*C. falcata* often) suppressed entirely; leaf-margins always entire; calyx 5-lobed:—

Bracts 1 in. long; leaves 7 to 9 in. long, main nerves about 12 pairs, prominent, both leaves of each pair always present and the two sometimes subequal; corolla over 1 in. long .. .. 2. *C. suffruticosa*.

Bracts .5 in. long; leaves 7 to 8 in. long; main nerves about 10 pairs, not prominent, one leaf of each pair always smaller than the other and sometimes entirely suppressed; corolla unknown .. .. 3. *C. falcata*.

Bracts lanceolate-acuminate; leaves 8 in. long, with one of each pair reduced to a subulate process; margins entire or sometimes crenate; calyx 2-fid; corolla 1.5 in. long .. 6. *C. pendula*.

Leaves of a pair always subequal:—

Margins of leaves serrate; calyx .5 in. long, 2-fid; corolla 1 in. long .. .. 4. *C. pilosa*.

Margins of leaves crenate; calyx 1.5 in. long, 3-fid; corolla 1.5 in. long .. .. 5. *C. lanceolata*.

Bracts connate in a large white cup; leaves of a pair always subequal .. .. 7. *C. cupulata*.

1. *CYRTANDRA DISPAR*, DC. Prodr. IX. 282 (1845). Shrub with a stout, pale, reticulate, fistular stem; obscurely 4-angled. *Leaves* alternate, obovate oblanceolate, inæquilateral, petioled; strongly toothed, especially at the apex; glabrous above, red-pubescent beneath; 12 in. long, 4 in. wide; petiole 1 in. long. *Flowers* small, very numerous, in axillary cymes; pedicels .25 in. long, hispid. *Calyx* persistent, cup-shaped, with 5 lanceolate, acuminate, hairy lobes. *Corolla* white, .5 in. long; tube dilated upwards, hairy outside; lobes short, obtuse, rounded. *Stamens* shorter than the tube; abortive ones very much reduced. *Pistil* hairy. *Berry* .25 in. long, oblong, ellipsoid, hairy. Miq. Fl. Ind. Bat. II. 742; Clarke in DC. Monog. Phan. V. i. 203, t. 23, and in Hook. f. Fl. Br. Ind. IV. 375; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 88. *C. frutescens*, Wall. Cat. 807 partly, not of Jack.

PENANG: Government Hill, Curtis 1204; Wallich 807; (part);



*Maingay* (K.D.) 1232. PERAK: Bujong Malacca, *Ridley* 9703; Larut Hills, *Ridley* and *Fox*, *Scortechini* 367, 1231; *Wray* 2196; *King's Collector* 2052, 5131, 3891.—DISTRIB. Sumatra.

2. *CYRTANDRA SUFFRUTICOSA*, *Ridley* in Trans. Linn. Soc. Ser. 2, III. 330 (1893). A large shrub, 4 ft. tall, with hollow 4-angled pale stems .25 in. thick. *Leaves* opposite, one of each pair often very much smaller alternately on one side or the other; lanceolate, abruptly acuminate, subfalcate, inæquilateral; edges entire; nerves conspicuous, about 12 pairs; glabrous when adult, young leaves and petioles red-pubescent; 7 to 9 in. long, 2.5 to 3 in. wide; petiole .5 to .75 in. long. *Peduncles* short and thick, axillary; bracts free, ovate acute, pubescent, 1 in. long, .5 in. across; flowers about 6 in a head, nearly sessile. *Calyx* deciduous; sepals linear. *Corolla* glabrous, over 1 in. long; base cylindric, dilated upwards; lobes rounded, obtuse, white with brown streaks in the throat. *Anthers* large, elliptic. *Style* pubescent. *Berry* .75 in. long, sausage-shaped. *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 89.

PERAK: *Scortechini* 142; Gopeng, *King's Collector* 4720; Kota Bahru, *King's Collector* 569; Tupai, Larut, *Wray* 2845. JOHORE: Tenggara, *Fielding*; Pulau Tioman, *Ridley*. On rocks.

*Ridley* says it is nearly allied to a Bornean species, *C. oblongifolia*, *Clarke*, but much larger in all parts. It is generally found growing on rocks or (*King's Collector* 4720) from the top of a high tree. *Wray* describes the flowers as "white marked in the throat with dark claret: bracts green without, claret within; fruit light green, finely spotted, paler."

3. *CYRTANDRA FALCATA*, *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 89 (1905). Epiphytic shrub, about 2 ft. tall; stem quadrangular, fistulose, pale. *Leaves* lanceolate acuminate, falcate; alternate, often with small opposite ones; glabrous when adult; narrowed at the base into the petiole; nerves about 10 pairs; 7 or 8 in. long, 1.5 in. wide; petiole 1 in. long, pubescent. *Cymes* axillary, .125 in. shortly peduncled; bracts broadly ovate, acute, pubescent, .5 in. long; flowers few, shortly pedicelled. *Fruit* fusiform, .5 in. long.

PERAK: *Wray* 2845; *Scortechini* 142. SELANGOR: woods round the Kuala Lumpur Caves, *Ridley* 8219.

Allied to *C. oblongifolia*, *Hook. f.*, and *C. suffruticosa*, *Ridley*, but the leaves are much narrower than those of the latter, and thinner and with more conspicuous nerves than those of the former.

4. *CYRTANDRA PILOSA*, *Blume* Bijdr. 770 (1826). Shrub with stout 4-angled hollow stems as much as .5 in. through, 3 ft. tall, upper parts pubescent. *Leaves* opposite, obovate, narrowed into a winged petiole; margins serrate; above more or less covered with pale hairs from a

swollen base, in old leaves often glabrescent, beneath covered with red hairs on the nerves; nerves prominent 10 to 12 pairs; 8 to 18 in. long, 3 to 4 in. wide. *Cymes* small, nearly sessile, axillary; bracts ovate or lanceolate acuminate, hairy, 1 in. long. *Calyx* tubular, hairy, .5 in. long, bifid. *Corolla* white, 1 in. long, silky-hairy; tube infundibuliform, stout; upper lobes oblong obtuse, lower two connate, shortly bifid, obtuse, punctate above. *Stamens* little longer than the tube; filaments glabrous; abortive stamens short. *Fruit* ovoid, conic, acute, brown, reticulate-tessellate, .5 to .75 in. long. G. Don Gen. Syst. IV. 661; DC. Prodr. IX. 282; Miq. Fl. Ind. Bat. II. 742; Zoll. Verz. Ind. Archip. 55; Clarke in DC. Monog. Phan. V. i. 231, and in Hook. f. Fl. Br. Ind. IV. 375; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 90. *C. decurrens*, De Vriese Pl. Ind. Bat. Reinwtd. 14; Miq. l.c. 746; Clarke l.c. 231, 375.

PENANG: Penara Bukit, Wallich 807, on banks in forests. PERAK: Larut Hills, Ridley 2915; Curtis 2897; Scortechini 354, 270; King's Collector 5588. SELANGOR: Bukit Kutu, Ridley 7574, Bukit Hitam, Pahang Track, 8560, 8554. NEGRI SEMBILAN: Bukit Tanga, Napier; Bukit Sulu, Cantley. JOHORE: Gunong Panti, Ridley; Bukit Tanah Abang, Kelsall.—DISTRIB. Tenasserim to New Guinea. In rocky woods up to about 2000 ft. altitude.

Ridley says he is unable to separate specifically the forms described respectively under the names of *C. pilosa*, Bl., and *C. decurrens*, De Vr., at least as far as applies to the variety *Wallichii* of the latter. The main distinction seems to be in the amount of hairiness of the leaves, in which point the plant seems very variable.

5. CYRTANDRA LANCEOLATA, Ridley in Journ. Linn. Soc. XXXII. 527 (1895). *Stem* about 1 ft. tall, quadrangular, upper part pubescent, the base bare. *Leaves* oblanceolate acute, narrowed at the base, crenulate, almost entirely glabrous; 12 in. long, 4 in. wide. *Cymes* at the base of the stem below the leaves very shortly peduncled, lax, many-flowered; pedicels .75 in. long, hispid; bracts lanceolate, small, hispid. *Calyx* 1.5 in. long, tubular, hispid; lobes 3, linear-acuminate. *Corolla* 1.5 in. long, dilated above, pubescent, white, throat yellow. *Anthers* long, narrowed above. *Style* 1 in. long, pubescent; stigma bilobed; lobes oblong, linear. Ridley in Journ. Str. Br. R. As. Soc. No. 43, 91.

JOHORE: Gunong Panti, Ridley.

6. CYRTANDRA PENDULA, Blume Bijdr. 768 (1826). *Stem* 1 or 2 ft. tall. *Leaves* alternate, ovate cordate or lanceolate, entire or crenate; dark green and glabrous above, often barred with white and covered with reddish tomentum beneath; 8 in. long, 4 to 6 in. wide; petiole 3 to 6 in. long, opposite leaf in each internode reduced to a subulate process

*Capitulum* of 20 flowers on peduncles 4 in. long, decurved, appressed-hairy; bracts lanceolate, acuminate, hairy; flowers shortly pedicelled. *Calyx*-tube .5 in. long, thin, shortly bifid. *Corolla*-tube 1.5 in. long; base narrow, curved, ventricose upwards, cream-coloured or pale yellow, hairy; upper lip of two rounded lobes, lower of three broader oblong rounded ones, all creamy white or pale yellow with purple spots in the mouth and tube. *Stamens* 2, glabrous; filaments purplish, sinuate; anthers oblong, connivent. *Style* stout, white; stigma transversely oblong. *Fruit* sausage-shaped, .5 in. long. G. Don Gen. Syst. Dichl. Pl. IV. 660; DC. Prodr. IX. 281; Miq. Fl. Ind. Bat. II. 739; Hook. Ic. Pl. t. 736; Clarke in DC. Monog. Phan. V. i. 242; Ridley in Journ. Str. Br. R. As. Soc. No. 43, 91. *C. bicolor*, Jack in Trans. Linn. Soc. XIV. 27; DC. *l.c.*; Clarke in Hook. f. Fl. Br. Ind. IV. 375; Miq. *l.c.*

PERAK: Larút Hills, *Curtis* 2036; *Scortechini* 142 and 254; *Wray* 2845; Ulu Bera, *King's Collector* 10810. SELANGOR: Kuala Lumpur, Bukit Hitam, *Ridley*. SUNGAI UJONG: Bukit Sulu, *Cantley*. MALACCA: *Maingay*. PAHANG: Kuala Tembeling, *Ridley*. JOHORE: Gunong Panti, Pulau Tioman. SINGAPORE: Bukit Timah, *Ridley* 2703; *King*.—DISTRIB. Java and Sumatra.

7. CYRTANDRA CUPULATA, *Ridley* in Journ. Linn. Soc. XXXII. 527 (1895). A shrubby plant 2 or 3 ft. tall; stem terete or more or less 4-angled above, covered with red hair. *Leaves* opposite, equal, very variable, oblanceolate with an acuminate base, serrately toothed; scantily hairy above, more hairy beneath; petiole sometimes winged to the base, villous, 1 in. long; blade 12 in. long, 4 in. wide. *Peduncles* .5 in. long, axillary in pairs, villous; bracts connate in a white hairy cup 1 in. long; bracteoles short, lanceolate, acute, white; flowers numerous, opening singly, little longer than the bract. *Corolla* 1 in. long, curved, infundibuliform, 2-lipped, pubescent, white, yellow and brown in the mouth; lobes 5 subequal, ovate, obtuse. *Stamens* included, 2. *Pistil* short; ovary oblong, with a terminal tuft of hair; style short, curved; stigma clavate, bilobed. *Fruit* .5 in. long, fusiform. *Ridley* in Journ. Str. Br. R. As. Soc. No. 43, 92.

PERAK: Tapa, *Wray* 1389 and 191; Ulu Bubong, *King's Collector* 10250; Larút Hills, *Scortechini* 366; Chanderiang, *King's Collector* 5833, in wet woods. MALACCA: lower slopes of Mount Ophir, *Ridley* 7575; Sungai Buluh, *Ridley* 10550. PAHANG: Tahan Woods, *Ridley* 2150.

## Family XC.—VERBENACEÆ.

Herbs, shrubs or trees. *Leaves* opposite or verticillate (apparently alternate in *Geunsia*), simple, digitate or pinnate (*Peronema*); stipules none. *Inflorescence* cymose, racemose or spicate, often in panicles; bracts usually small, sometimes leafy; flowers hermaphrodite or sometimes polygamous, generally irregular, often brightly coloured, sometimes with coloured calyx or enlarged coloured involucre. *Calyx* inferior, gamosepalous, 5- to 4- (rarely 6- to 8-) lobed, often accrescent. *Corolla* gamopetalous; tube usually cylindric or dilated above, often curved; limb 2-lipped or subequally lobed; lobes 4 or 5, rarely more. *Stamens* usually 4 didynamous, sometimes 2, sometimes 5. 6 or more, inserted on the corolla-tube; filaments free; anthers 2-celled, opening longitudinally. *Ovary* superior, sessile, 2- to 4-celled, entire or 4-lobed; ovules variously attached, 2 (sometimes 1) in each cell; style terminal; stigma entire or bifid at apex. *Fruit* drupaceous with bony pyrenes, or capsular, 1- to 4-celled; mesocarp usually fleshy; endocarp usually bony. *Seeds* erect or pendulous, separate in distinct cells; albumen usually none; embryo straight; radicle inferior.—DISTRIB. Tropical regions of both hemispheres, very few extending to temperate countries; species about 750.

Inflorescence spicate, centripetal (the lowest flowers opening first) (Tribe I. VERBENÆ):—

Shrubs or herbs with short spikes; calyx minute; stamens 4; anther-cells parallel:—

Fruit a drupe with fleshy mesocarp .. .. 1. LANTANA.

Fruit dry with thin granular mesocarp .. .. 2. LIPPIA.

Herbs with long spikes; calyx long, tubular; stamens 2;

anther-cells divaricate .. .. 3. STACHYTARPHETA.

Inflorescence cymose, centrifugal (the end flowers opening first):—

Cymes paniculate; drupes fleshy (Tribe II. VITICÆ):—

Leaves simple:—

Corolla regular; stamens isomerous, equal:—

Flowers 5-merous; drupe with 5 to 10 pyrenes .. 4. GEUNZIA.

Flowers 4-merous; drupe with 4 pyrenes .. 5. CALLICARPA.

Flowers 4- to 6-merous; drupe with 14-celled endocarp, included in the accrescent calyx .. 6. TECTONIA.

Corolla 2-lipped; stamens didynamous:—

Drupe with 1 pyrene:—

Flowers small .. .. 7. PREMNA.

Flowers large .. .. 8. GMELINA.

Drupe with 4 pyrenes (1 to 3 often suppressed) .. 9. CLERODENDRON.

Leaves digitate or in 1 species unifoliate; pyrene 1 .. 10. VITEX.

Cymes paniculate ; drupes capsular (Tribe III. CARYOPTERIDÆ) :—

- Leaves imparipinnate ; fruit 4-celled ; calyx not enlarged  
in fruit ; trees                      ..                      ..                      ..                      11. PERONEMA.  
Leaves 1- to 3-foliolate ; fruit 2-celled ; calyx much  
enlarged in fruit ; climbers                      ..                      ..                      ..                      12. PETRÆOVITEX.

Cymes capitate ; bracts of the flower-head usually large  
and involucriform ; large climbers (Tribe IV. SYMPHOREMEÆ) :—

- Involucral bracts 6 ; corolla-lobes subequal ; stamens  
included or exsert                      ..                      ..                      ..                      13. SPHENODESMA.  
Involucral bracts 4 ; corolla 2-lipped, the two lobes of  
the upper lip the longest ; stamens exsert                      ..                      ..                      ..                      14. CONGEA.

Cymes densely capitate or in short spikes, centripetal ;  
flowers small ; calyx-segments 5, much imbricate ; trees or  
shrubs (Tribe V. AVICENNIEÆ)                      ..                      ..                      ..                      15. AVICENNIA.

HOLMSKIÖLDIA SANGUINEA, Retz. Obs. VI. 31 (1791), is a straggling shrub of the Eastern subtropical Himalaya, with a large red obconic calyx and red flowers, often cultivated in gardens and occasionally found as an escape.

PENANG : on Government Hill, *Curtis* 2879.

DURANTA PLUMIERI, Jacq. Select. Stirp. Amer. 186, t. 176, fig. 76 (1763), is a blue-flowered shrub cultivated in gardens and sometimes found run wild in their neighbourhood.

SINGAPORE : *Ridley*.

## Tribe I. VERBENEE.

### 1. LANTANA, Linn.

Erect or subscandent, often rambling, pubescent or scabrous shrubs, rarely herbs ; branches usually tetragonal, sometimes prickly. *Leaves* simple, opposite or ternate, petiolate, inciso-crenate, more or less rugose. *Flowers* in dense pedunculate spikes from the axils of the leaves, variable in colour ; the spikes capitate, ovoid or cylindric ; bracts conspicuous, persistent, ovate or lanceolate ; bracteoles none. *Calyx* small, membranous, campanulate, truncate or 4- to 5-toothed. *Corolla* hypocrateriform ; tube slender, cylindric ; lobes 4 to 5, spreading, orbicular. *Stamens* 4 didynamous, included in the corolla-tube and inserted at its middle ; anthers broadly oblong with parallel cells. *Ovary* 2-celled ; ovule solitary in each cell, erect from the base or laterally attached close to the base ; style short ; stigma oblique or sublateral, thickened. *Fruit* a drupe with more or less fleshy mesocarp ; endocarp hard, separating when ripe into two 1-celled, 1-seeded pyrenes. *Seed* exalbuminous ; testa reticulate ; radicle inferior.—**DISTRIB.** Species about 50, tropical or subtropical, mostly American, a few African or Asiatic.

Bracts lanceolate; without prickles	..	..	1. <i>L. salvifolia</i> .
Bracts ovate, acuminate; with recurved prickles	..	..	2. <i>L. aculeata</i> .

1. *LANTANA SALVIFOLIA*, Jacq. Hort. Schoenbr. III. 18, t. 285 (1798). An erect branching shrub, reaching 3 to 8 ft. in height; stems rough, without prickles; branchlets quadrangular, strigosely hispid, yellowish-brown. *Leaves* opposite or in whorls of 3, membranous when dry; ovate-lanceolate, acute at apex, suddenly narrowed and then decurrent at base; both surfaces rugose, the upper strigosely hispid, the lower villous and pale; margins crenate-serrate; 2 to 5 in. long, 1 to 2 in. broad; main nerves 8 to 12 pairs, the lowest pair opposite and more oblique than the others, all curving to the margin; reticulations prominent; petiole .2 to .4 in. long, winged by the decurrent margins of the blade. *Spikes* globose to oblong, .5 to 1 and even 1.5 in. long, gradually elongating as the fruit ripens; peduncles angular, hispid, 1 to 3 in. long; bracts ovate, caudate-acuminate, strigosely villous, .25 in. long. *Calyx* minute, truncate, densely villous. *Corolla*-tube curved, slightly inflated opposite the stamens, villous without, .2 in. long; lobes spreading, rounded, the uppermost slightly acute. *Filaments* short; anther-cells equal. *Drupe* oblong, purple; exocarp thin, hispid; mesocarp fleshy; endocarp rugose, the 2 pyriform pyrenes of which it is composed closely adherent. *Seed* elliptic; testa reticulate; cotyledons thin. Baker in Dyer Fl. Trop. Afr. V. 276; Schauer in DC. Prodr. XI. 605. *L. indica*, Roxb. Hort. Beng. 46 (1814), and Fl. Ind. III. 89; Wall. Cat. 1823 A,B; Wight Ill. t. 173 b, fig. 3, and Ic. t. 1464; Trimen Fl. Ceyl. III. 346; Clarke in Hook. f. Fl. Br. Ind. IV. 562; Cooke Fl. Bomb. II. 418; Prain Beng. Plants 825. *L. dubia*, Wall. Cat. 1821, 2 and c, not 1; Royle Ill. 300 t. 73, fig. 2. *L. collina*, Dcne. in Jacquem. Voy. Bot. 136, t. 141. *L. alba*, Schauer l.c. 606; Dalz. & Gibs. Bomb. Fl. 198; Brandis For. Fl. 369; Kurz For. Fl. II. 253; Boiss. Fl. Orient. IV. 532, not of Miller, Dcne. or Link.

PENANG: *Ridley*; *Curtis* 121; *Deschamps*. PERAK: at Teluk Anson, *Ridley* 10762. MALACCA: *Ridley* 10115. SINGAPORE: *Deschamps*; *Kunstler* 135.—DISTRIB. India, Burma, Ceylon, Tropical and South Africa.

2. *LANTANA ACULEATA*, Linn. Sp. Pl. 627 (1753). A very straggling erect shrub with many branches, 4 to 8 ft. high; branchlets quadrangular, armed with recurved prickles. *Leaves* opposite; ovate, acute at apex, truncate or cordate at base; the blade decurrent; upper surface scabrous, lower pubescent; margins crenate, 1 to 3 in. long, 1 to 2 in. broad; midrib slender; main nerves 5 to 6 pairs, curving upwards to the margin; reticulations netted; petiole slender, .5 to .7 in. long, the upper part bordered by the decurrent margins of the blade. *Spikes*

globose, .25 to 1 in. in diam.; peduncles 1 to 1.5 in. long, hispid; bracts lanceolate, .25 in. long; flowers of various colours, orange, red, and white. *Calyx* very small, slightly 2-lipped, pubescent. *Corolla*-tube slender, pubescent, .2 to .4 in. long; lobes rounded, spreading. *Filaments* very short; anther-cells unequal. *Drupe* ovoid, black, shining, .1 to .2 in. in diam.; pyrenes rounded. Bot. Mag. t. 96; Dalz. & Gibs. Suppl. 68; Trimen Fl. Ceyl. III. 346. *L. Camara*, Linn. l.c.; Schauer in DC. Prodr. XI. 598; Hook. f. Fl. Br. Ind. IV. 562; Cooke Bomb. Fl. II. 419; Prain Beng. Plants 825; Baker in Dyer Fl. Trop. Afr. V. 275.

PENANG: *Curtis*; *Deschamps*. PROVINCE WELLESLEY: *G. King*. SINGAPORE: *Deschamps*.—DISTRIB. Native of Tropical America, now widely spread in many regions of the Old World and very troublesome from its quick and strong matted growth.

## 2. LIPPIA, Linn.

Shrubs or undershrubs, rarely herbs, usually more or less hairy. *Leaves* opposite, ternate or verticillate, rarely alternate; entire dentate or lobate. *Flowers* small, in elongate or cylindrical or capitulate spikes; bracts small, imbricate; bracteoles none. *Calyx* small, membranous, 2- to 4-lobed, ultimately 2-valved; enclosing or sometimes adhering to the fruit. *Corolla* more or less hypocrateriform; tube cylindrical, straight or curved; limb oblique, more or less bilabiate; upper lip bifid, emarginate or 2-lobed; lower lip 3-lobed. *Stamens* 4 didynamous, included in the corolla-tube and inserted at its middle; anthers ovate with parallel cells. *Ovary* 2-celled; ovule solitary in each cell, erect from the base or laterally attached near the base of the cell; style short; stigma capitate, oblique or recurved, thickened. *Fruit* small, with a dry epicarp; mesocarp granular; endocarp hard, bony, easily separating into two 1-seeded pyrenes. *Seed* exalbuminous; radicle inferior.—DISTRIB. About 100 or more species, chiefly Tropical American, with a few African and only very few Asiatic.

LIPPIA NODIFLORA, Michx. Fl. Bor. Amer. II. 15 (1803). A creeping perennial herb; stems rooting at the nodes, much branched, sub-quadrangular, channelled, more or less clothed with appressed, medifixed, white hairs, often glabrous. *Leaves* opposite, subsessile, spatulate, rounded at apex, cuneate at base; both surfaces appressedly hairy with medifixed white hairs; upper half deeply and sharply serrate, lower entire; .75 to 1.25 in. long, .25 to .75 in. broad; midrib prominent; main nerves 3 to 4 pairs, straight. *Spikes* dense, globose at first, afterwards gradually elongating to oblong in fruit, .25 to .5 in. long; peduncles 1 to 3 in. long, usually from only one axil of each pair

of leaves, slender, quadrangular, channelled; bracts much imbricate, variable, .1 to .2 in. long, lower broadly ovate, upper narrowly cuneate, all acuminate with more or less hyaline fimbriate margins; flowers small, pale blue, pink, or white. *Calyx* 2-lobed; lobes lanceolate, pubescent. *Corolla*-tube slender, .1 in. long; limb 2-lipped, lower lip 3-lobed, midlobe obtuse. *Stigma* capitate. *Fruit* .05 to .075 in. long, glabrous, ovoid; epicarp bony, membranous; mesocarp granular; endocarp separating in two plano-convex pyrenes. *Seed* elliptic; testa membranous; cotyledons fleshy. Schauer in DC. Prodr. XI. 585; Wight Ill. t. 173 b, fig. 2, and Ic. t. 1463; Dalz. & Gibs. Bomb. Fl. 198; Clarke in Hook. f. Fl. Br. Ind. IV. 563; Miq. Fl. Ind. Bat. II. 905; Trimen Fl. Ceyl. III. 347; Cooke Bomb. Fl. II. 420; Prain Beng. Plants 825; Baker in Dyer Fl. Trop. Afr. V. 279. *Verbena nodiflora*, Linn. Sp. Pl. 20; Burm. Fl. Ind. 12, t. 6, fig. 1; Roxb. Hort. Beng. 4. *Blairia nodiflora*, Gaertn. Fruct. I. 266, t. 56. *Zapania nodiflora*, Lamk. Ill. t. 17; Wall. Cat. 1824. *Latana sarmentosa* and *repens*, Spreng. Syst. II. 752. *Phyla chinensis*, Lour. Fl. Cochinch. 66.

PENANG: at Sangie Penang, *Curtis* 3520. PROVINCE WELLESLEY: *Curtis* 2208. SINGAPORE: *Kunstler* 1198, in grassy and sandy places near the coast.—DISTRIB. India, Malay Archipelago, Africa and most tropical and subtropical regions.

### 3. STACHYTARPHETA, Vahl.

Herbs or shrubs. *Leaves* usually opposite, toothed, usually rugose. *Flowers* in terminal spikes in the axils of bracts, the rachis often hollowed out beneath each flower; bracts lanceolate, long or short; bracteoles none. *Calyx* elongate, narrowly cylindrical, shortly 4- to 5-toothed, variously slit at a late stage. *Corolla* hypocrateriform; tube slender, cylindrical, usually curved; limb spreading, 5-lobed; the lobes equal or unequal, rounded. *Stamens* 2 perfect (the anticous ones), included in the corolla-tube, affixed above the middle; filaments short; anther-cells vertically divaricate; staminodes (posticous) 2 or 0. *Ovary* 2-celled; ovules solitary in each cell, attached laterally near its base; style long, filiform, exsert; stigma capitate. *Fruit* cylindrical, included in the calyx, separating into 2 bony 1-seeded pyrenes. *Seeds* oblong; testa membranous; albumen none; cotyledons fleshy; radicle inferior.—DISTRIB. About 40 species, mostly Tropical American, a few African; the Indo-Malayan species probably introduced and run wild.

Spikes usually slender, glabrous; flowers blue	..	..	1. <i>S. jamaicensis</i> .
Spikes usually stout, hairy; flowers pink	..	..	2. <i>S. mutabilis</i> .

1. STACHYTARPHETA JAMAICENSIS, Vahl Enum. I. 206 (1805). An



annual erect branched herb, reaching 1 to 3 ft. high; stems dichotomously branched, nearly quadrangular. *Leaves* opposite, elliptic, obtuse or acute at apex, cuneate at base and decurrent, upper two-thirds coarsely serrate, lower cuneate portion entire; both surfaces glabrous or nearly so; 1 to 4 in. long, 1 to 1.5 in. broad; midrib slender; main nerves slender, 4 to 6 pairs, curved upwards; petiole obscure, being winged by the decurrent margins of the blade. *Spikes* elongate, 3 to 12 in. long, slender; rachis up to .15 in. in diam., conspicuously excavated to hold the flowers, the hollows closed by the bracts; bracts lanceolate, acuminate, scarious and ciliate on the margins, .15 to 2 in. long; flowers blue. *Calyx* .25 in. long, membranous, glabrous, 4- to 5-toothed, usually slit on one side (that in the hollow of the rachis). *Corolla*-tube curved outwards, .3 to .5 in. long; limb spreading, 5-lobed. *Fruit* dry, .15 in. long, tipped with the slender remains of the style; pyrenes plano-convex, very hard. Bot. Mag. t. 1860. *S. indica*, Vahl, *l. c.*; Clarke in Hook. f. Fl. Br. Ind. IV. 564; Trimen Fl. Ceyl. III. 348; Cooke Bomb. Fl. II. 421; Prain Beng. Plants, 826; Baker in Dyer Fl. Trop. Afr. V. 284. *S. urticifolia*, Dalz. & Gibs. Bomb. Fl. Suppl. 68. *Stachytarpha jamaicensis*, Schauer in DC. Prodr. XI. 564. *S. indica*, Schauer in DC. *l. c.*; Miq. Fl. Ind. Bat. II. 907. *Verbena jamaicensis*, Linn. Sp. Pl. 19; Roxb. Hort. Beng. 4. *V. indica*, Linn. Sp. Pl. ed. 3, 27; Wall. Cat. 2656.

PENANG: common by roadsides, *G. King*; on Government Hill, *Curtis*. PERAK: at Panjsore, *Scortechini* 996. JOHORE: *Marius, Jensen*. SINGAPORE: *Cuming* 2406; in waste places, *Deschamps*; *Kunstler (King's Collector)* 173, 1149.—DISTRIB. India, Ceylon, Malay Archipelago, Tropical Asia and Africa; in Malaya probably introduced and run wild.

2. STACHYTARPHETA MUTABILIS, Vahl Enum. I. 209 (1805). A stout branching pubescent herb, reaching 3 ft. high or more; stems quadrangular, densely tawny-pubescent. *Leaves* opposite, ovate acute at apex, rounded at base and decurrent; upper three-fourths broadly crenate, the crenatures mucronate, basal part entire; upper surface sparsely villous and scabrid, lower softly grey-tomentose; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib stout; main nerves 6 to 8 pairs; petiole 1.5 to 1 in. long, almost entirely bordered by the decurrent margins of the blade. *Spikes* stout, elongate, 6 to 18 in. long; rachis up to .25 in. in diam., excavated vertically to hold the flowers, the hollows closed by the bracts; bracts ovate-lanceolate, cuspidate-acuminate, strigosely hairy, .25 to .5 in. long; flowers pink. *Calyx* .4 to .5 in. long, strigosely pubescent, 4-toothed on the outer side, cleft on the inner, the teeth acute. *Corolla*-tube curved outwards, up to 1 in. long, slightly

dilated at the throat; limb spreading, lobes 5 rounded. *Anther*-cells .05 in. long; filaments villous; staminodes subulate, villous, .15 to .2 in. long. *Fruit* oblong, ovoid or somewhat pyriform, tipped with the long remains of the style; pyrenes plano-convex, very hard, .2 to .25 in. long. *Seed* oblong, .15 in. long; testa membranous; cotyledons obovate, .1 in. long, fleshy. Schauer in DC. Prodr. XI. 565; Bot. Mag. t. 976; Cooke Bomb. Fl. II. 422; Baker in Dyer Fl. Trop. Afr. V. 284. *Verbena mutabilis*, Jacq. Coll. 2, 334; Icon. Rar. 2, 207; Andr. Bot. Rep. t. 435.

PENANG: Curtis 867; Birch; Ridley 7044. SINGAPORE: in waste places, *Deschamps*.—DISTRIB. A native of Tropical America, widely spread in the Old World, *e. g.*, Southern India, Java, Central Africa

## Tribe II. VITICEÆ.

### 4. GEUNZIA, Blume.

Trees or large shrubs, stellately tomentose. *Leaves* opposite or occasionally alternate by the separation of the leaves of a pair, petiolate, entire. *Flowers* small, in many-flowered pedunculate cymes in the upper axils of the branchlets; bracts linear, small. *Calyx* campanulate, shortly 5- to 6-toothed. *Corolla* campanulate; tube exsert, funnel-shaped; lobes 5, spreading. *Stamens* 5 to 6; anthers oblong, exserted, glandular, dorsifixed; cells parallel, dehiscing longitudinally but more widely at tip; filaments slender. *Ovary* imperfectly 5-, rarely 4- to 3-celled; the cells 2-ovulate; the ovules fixed laterally above the middle of the cell; style exsert, stout; stigma 5- or less lobed, dilated. *Drupe* small, globose, depressed, on the persistent not enlarged calyx; exocarp thin; mesocarp granular; endocarp hard; pyrenes 5 to 10, equal in number to the ovules, 1-seeded. *Seeds* small, oblong-ovoid; testa thin; albumen none; cotyledons fleshy; radicle inferior.—DISTRIB. 3 to 4 species, of the Malay Peninsula and Archipelago.

GEUNZIA FARINOSA, Blume Bijdr. 819 (1826). A large tree, reaching 60 to 70 ft. in height and a considerable diameter; the upper branches, inflorescence, and under surface (also upper surface when young) of leaves covered more or less densely with stellate furfuraceous pale brown tomentum, and also often with minute rounded glands. *Leaves* coriaceous, ovate or elliptic-oblong, long cuspidate-acuminate at apex, rounded or subacute at base; upper surface when young farinose, later glabrous; lower surface rugose; margin entire or minutely denticulate, 5 to 9 in. long, 2 to 4 in. broad; midrib prominent; main nerves 10 to

12 pairs obliquely curved upwards and joined by many more or less parallel transverse nerves; reticulations close; petiole stout, 1 in. long, channelled above, the opposite ones joined by a raised line. *Cymes* rounded, dichotomously branched, 1·5 to 2 in. broad; peduncles 1 to 1·5 in. long; bracts subulate, ·15 to ·2 in. long; pedicels very short; flowers reddish-purple. *Calyx* ·06 in. deep, glabrous within. *Corolla*-tube ·1 to ·2 in. long, glandular; lobes recurved, ·05 in. long, rounded. *Stamens* exserted; filaments a little longer than the corolla-tube; anthers ·1 in. long, very glandular on the back. *Drupe* reddish-black when ripe, ·15 in. broad, ·1 in. in diam., top depressed. Clarke in Hook. f. Fl. Br. Ind. IV. 566; Bocquillon Revis. Verben. 89, t. 8; Koord. & Valetton Bijdr. VII. 173. *G. Cumingiana*, Rolfe in Journ. Linn. Soc. XXI. 315. *Callicarpa pentandra*, Roxb. Fl. Ind. I. 395; Wall. Cat. 1836; Schauer in DC. Prodr. XI. 646; Miq. Fl. Ind. Bat. II. 885. *C. acuminatissima*, Teysm. & Binn. in Batav. Nat. Tijdschr. XXV. 409. *C. Cumingiana*, Schauer, l. c. 644.

KEDAH: on Langkawi Island, *Curtis* 2552. PERAK: *King's Collector* 859, 972 (*part*), 5731, 8547. SELANGOR: at Batu Tiga, *Curtis* 3767; at Ginting Bidai, *Ridley* 7599; at Rawang, *Ridley* 10494. SINGAPORE: *Wallich* 1836.—DISTRIB. Java (*Forbes* 315, 375, 539, 602; *Kollman*; *Koorders* 15204B), Borneo (*Beccari* 786; *Haviland* 554, 1343, 3553; *Motley* 385), Amboina, Philippine Islands, &c.

The following Bornean species seems to be undescribed:—

GEUNSLIA HAVILANDII, King & Gamble in Kew Bull. 105 (1908). A tree (?); branches, inflorescence, and under surface of leaves densely tawny-stellate-pubescent and strigosely hairy. *Leaves* opposite, ovate or ovate-oblong, shortly acuminate and mucronate at apex, acute or cuneate at base; upper surface strigosely scabrous-hispid on the upper surface, especially on the midrib; lower surface rugose, stellate-pubescent and studded with peltate glands; margins rather distinctly denticulate; 2·5 to 6 in. long, 1·5 to 2·5 in. broad; midrib stout, prominent; main nerves 9 to 11 pairs, prominent beneath, gently curving upwards to anastomose near the margin, joined by conspicuous transverse nervelets; reticulations netted; petiole stout, tawny-hispid, ·5 to ·75 in. long. *Cymes* axillary, few-flowered, subsessile, scarcely longer than the petiole; bracts very small, subulate; pedicels slender, short. *Calyx* campanulate, glabrous within, without very strigosely hispid; teeth 5, minute in bud, afterwards elongating to ·05 in. long. *Corolla* campanulate, nearly glabrous except for peltate shining glands; tube ·1 in. long; lobes 5, ovate, rounded, about ·075 in. long, recurved in flower. *Stamens* exserted; filaments slender, glabrous; anthers ·1 in. long, oblong, prominently yellow-glandular on the back. *Ovary* thickly glandular, depressed; style slender, 2 in. long; stigma shortly 5-lobed. *Drupe* reddish-black when dry, ·15 in. in diam., top depressed, dividing into 5 pyrenes; fruiting calyx flattened.

BORNEO: at Sarawak, *Beccari* 3240; *Haviland* 3549 K and L: near Kuching, *Haviland* 889.

We are a little in doubt whether this is the *G. Beccariana*, Briquet in Engl. & Prantl Nat. Pflanzenfam. IV. 3 and 165, of which we can find no description. We think, however, that Briquet's *G. Beccariana* is Beccari 2759, a beautiful species from Sarawak with long tawny hair.

### 5. *CALLICARPA*, Linn.

Trees or shrubs, more or less clothed with stellate or farinose tomentum, with or without glandular scales, rarely quite glabrous. *Leaves* opposite, rarely ternately whorled; crenulate serrulate or rarely entire, in one species lobed. *Flowers* small, white red or purple, in axillary sessile or pedunculate, usually many-flowered, cymes; bracts linear, inconspicuous. *Calyx* very small, shortly campanulate, truncate or minutely 4-lobed, unaltered in fruit. *Corolla* small, campanulate or tubular; tube twice as long as the calyx or less; lobes 4, oblong, erect or spreading. *Stamens* 4 equal, inserted at about the middle of the tube or lower, sometimes at the base; filaments slender, exsert; anthers ovate or oblong, dorsifixed; the cells parallel, both sides usually prominently glandular. *Ovary* imperfectly 2-celled; cells 2-ovuled; style elongate; stigma dilated, shortly and obscurely bifid; ovules attached at the middle of the cell or higher. *Fruit* a small globose drupe, supported by the persistent calyx; exocarp thin; mesocarp fleshy; endocarp bony, of 4 or fewer pyrenes, convex on the back, flattened on the sides. *Seeds* small, oblong; testa membranous; albumen none or evanescent; cotyledons fleshy; radicle inferior.—*DISTRIB.* About 30 species, of Tropical and Subtropical Asia, to Japan, Australia and Polynesia; also in Central America and the West Indies.

Lower surface of leaves covered with dense stellate tomentum, without or with very few glandular dots; margins of leaves entire or nearly so:—

Leaves broad, more or less elliptic; cymes long, many-flowered:—

Leaves long-acuminate, tomentum thick; cymes dense; corolla-tube only about .075 in. long, merely puberulous

1. *C. arborea*.

Leaves obtuse or very shortly acuminate, tomentum thin; cymes spreading; corolla-tube .1 in. long, stellate-pubescent

2. *C. Maingayi*.

Leaves narrow, lanceolate; cymes short, few-flowered; corolla-tube .15 in. long, stellate-pubescent .. ..

3. *C. angustifolia*.

Lower surface of leaves densely grey stellate-flocculose, with many glandular dots on both surfaces; margins of leaves serrate:—

Cymes spreading, reaching 3 to 4 in. in diam.; upper surface of leaves glabrate, lower densely grey-flocculose .. ..

4. *C. Reevesii*.

Cymes dense, rounded, rarely 1 to 2 in. in diam.:—

Upper surface of leaves glabrate, lower whitish-grey, stellately tomentose .. ..

5. *C. cana*.

Upper surface of leaves hispid-puberulous, lower thinly grey-stellate-tomentose .. .. .	6. <i>C. pedunculata</i> .
Lower surface of leaves sparsely stellate hairy, with many glandular dots; margins of leaves serrulate; cymes rounded, up to 2 in. broad .. .. .	7. <i>C. longifolia</i> .

1. *CALLICARPA ARBOREA*, Roxb. Hort. Beng. 10 (1814), and Fl. Ind. I. 390 (1832). A tree reaching 40 ft. in height, with thick trunk and round head; branches stout; branchlets thick, obtusely quadrangular, covered with dense grey-tawny, forked, stellate or mealy tomentum, as are the young leaves and inflorescence. *Leaves* coriaceous; ovate or elliptic-ovate, acuminate at apex, long acute or cuneate at base; upper surface when young with mealy soft stellate-tomentum, afterwards glabrous, lower closely tawny-stellate tomentose; margins entire or sometimes distantly denticulate; 6 to 12 in. long, 2 to 5 in. broad; midrib very stout, much raised beneath; main nerves stout, 8 to 14 pairs, raised beneath and joined by fairly regular transverse raised nervules, the main nerves starting at an angle of about  $55^\circ$  with the midrib and curving gently to the margin, where they anastomose; petiole stout, 1 to 2.5 in. long, channelled above. *Cymes* very many-flowered, widely dichotomously branched many times, reaching 6 in. in length and about 5 in. in breadth; peduncles 1 to 3 in. long; bracts linear-subulate, .25 in. long or less; pedicels very short; flowers red or purple. *Calyx* .05 in. long, truncate and minutely 4-toothed at mouth, glabrous within. *Corolla*-tube .075 in. long, puberulous without; lobes 4, reflexed, subquadrate, as long as tube, villous without. *Stamens* long, exsert; anthers glandular-punctate on the back. *Ovary* villous; style much exsert, bent outwards, enlarged upwards; stigma peltate at first, then broadly funnel-shaped. *Drupe* .15 to .2 in. in diam., succulent, purple, ultimately black; pyrenes 4 or less. Wall. Cat. 1826 chiefly. Schauer in DC. Prodr. XI. 641; Brandis For. Fl. 368; Kurz For. Fl. II. 274; Clarke in Hook. f. Fl. Br. Ind. IV. 567; Prain Beng. Plants 827. *C. tectonæfolia*, Wall. Cat. 1827.

KEDAH: at Campong Yan, Ridley 5607. PENANG: Tanjong Bunga, Curtis 699; Batu Gaja jungles, Deschamps. PERAK: Wray 1824, 3957; at Bruas Dindings, Ridley 7179; *Scortechini*; King's Collector 972 (part).—DISTRIB. India (Kumaon to Assam, Sonthal Parganas. Chota Nagpore, Eastern Bengal), Burma, Sumatra (*Teysmann* 4388; *Forbes* 1530, 2601).

VAR. *villosa*, Roxb. Hort. Beng. 10 (species). *Leaves* 6 to 8 in. long, 3.5 to 4.5 in. broad, ovate, caudate-acuminate at apex, rounded and then slightly decurrent at base. Tomentum of branchlets, young leaves, and inflorescence very thick and pale, chiefly consisting of

branched hairs. This var. resembles *C. lanata*, Linn., of Southern India and Ceylon in its leaves, but the flowers are those of *C. arborea*.

PERAK: *Scortechini*.

2. *CALLICARPA MAINGAYI*, King & Gamble in Kew Bull. 106 (1908). A tree; young branches, inflorescence, and leaves beneath covered with minute golden-brown stellate tomentum; branchlets stout, obtusely quadrangular. *Leaves* coriaceous, elliptic or elliptic-obovate, rounded and very shortly acute or acuminate at apex, rounded and then somewhat cuneate at base, the two sides often unequal; upper surface glabrous except the midrib and main nerves of young leaves; lower surface rugose and very minutely appressed stellate-pubescent; margins entire or undulate with minute denticulations at the ends of the nerves; 6 to 12 in. long, 3 to 6 in. broad; nerves all impressed on the upper surface, sharply and strongly raised on the lower; the midrib stout; main nerves 10 to 12 pairs, starting at about 75° with the midrib and curving upwards to anastomose near the margin, the pairs joined by fairly regular transverse nervules, and these again by the netted reticulations; petiole 1·5 to 2 in. long, stout, channelled above. *Cymes* many-flowered, rounded, reaching 3·5 in. long and 6 in. broad, widely dichotomous; peduncle stout, flattened, 1 to 1·5 in. long, further branch-peduncles also flattened when dry; bracts linear-subulate, very small; pedicels ·05 to ·1 in. long, slender. *Calyx* hemispherical, ·05 in. long, tawny stellate-pubescent without, glabrous within, with 4 minute teeth. *Corolla*-tube nearly cylindric, ·1 in. long, densely and closely grey-stellate-tomentose without, nearly glabrous within; lobes short, rounded, erect or slightly recurved, ·04 in. long, villous within. *Stamens* inserted at ·04 in. from base of tube; filaments ·175 in. long; anthers oblong, ·075 in. long, glandular-punctate on the back. *Ovary* villous; style slender, bent; stigma broad, peltate. *Drupe* small, black, ·06 in. in diam. (immature).

SELANGOR: *Ridley* 2787. MALACCA: *Maingay* (K.D.) 1192; at Hulu Chembong, *Derry* 1005, Vern. "*Tampang Besi*."

In Kew Herbarium, Maingay's specimen has been placed under *C. arborea*, but the species differs in many respects. The venation of the leaves is very different, as is the tomentum of much smaller stellate hairs; the leaves are nearly blunt; the tube of the corolla much longer, and its lobes much shorter; and we have no hesitation in describing it as a new species.

3. *CALLICARPA ANGUSTIFOLIA*, King & Gamble in Kew Bull. 106 (1908). A shrub, reaching 8 to 9 ft. in height; branchlets, inflorescence, and leaves beneath (also young ones above) clothed with appressed grey or ferruginous stellate tomentum; branchlets obscurely quadran-

gular. *Leaves* subcoriaceous; lanceolate, attenuately acute at apex, long attenuate at base and decurrent; upper surface dark, glabrous except when young; lower densely tomentose, grey-tawny or silvery; margins entire or rarely obscurely denticulate, slightly recurved; 4 to 7 in. long, .75 to 1.5 in. broad; midrib stout, impressed above, prominent beneath; main nerves 9 to 15 pairs, rather irregular, starting at from 60° to 70° with the midrib and at once curving upwards to and along the margin, joined by subparallel transverse nervules; petiole .5 to .75 in. long, the bases of the opposite leaves joined by a well-marked ridge. *Cymes* few-flowered, .5 to .75 in. long and about .75 in. broad, widely dichotomous; peduncles .25 to .35 in. long; bracts linear-subulate; pedicels very short, jointed; flowers bluish-pink. *Calyx* campanulate, .075 in. long, densely stellate-tomentose without, glabrous within; teeth mucronulate. *Corolla* about twice as long as calyx, densely stellate-tomentose without, glabrous within; lobes rounded, erect. *Stamens* inserted at or very near the base of the corolla-tube; filaments slender, .15 in. long, scarcely or not exsert; anthers .06 in. long, oblong, much glandular-dotted on both sides. *Ovary* villous; style slender, exsert; stigma capitate. *Drupe* glabrous, globose, .1 in. in diam., dark blue when ripe; pyrenes 4.

KEDAH: on Langkawi Island, *Ridley* 8330. PERAK: at Ipoh, *Curtis* 3197; at Batu Kuran, *Scortechini* 1596; on the top of limestone hills 600 to 1000 ft., *King's Collector* 7036, 8236.

The Kedah specimens have narrower leaves than the rest, with more slender branchlets. The species comes near to *C. angusta*, Schauer, from the Philippines, but differs in the almost quite entire leaves and larger flowers and fruit.

4. *CALLICARPA* REEVESII, Wall. Cat. 1830 (1828). A shrub; the branches, petioles, under surface of leaves, and inflorescence covered with a soft, whitish-grey or pale tawny, mealy tomentum of branched or stellate hairs. *Leaves* coriaceous; lanceolate or elliptic-lanceolate, long acute at apex, attenuate at base and often slightly unequal, not decurrent; upper surface dark when dry, glabrous except the nerves, lower tomentose; margins entire for the lower third, above that shortly dentate-serrate; 5 to 8 in. long, 2 to 3 in. broad; midrib stout; main nerves 13 to 15 pairs, nearly regular, starting at an angle of 45° to 60° with the midrib and curving gently to the margin, each pair joined by rather obscure transverse nervelets, all slightly impressed above; petiole .75 in. long. *Cymes* axillary, rounded, many-flowered, widely dichotomous, reaching 4 in. long and about 3 in. broad; peduncles 1.5 to 2 in. long; bracts linear subulate, .1 in. long; pedicels short, slender, nearly glabrous, .05 to .1 in. long; flowers purple? *Calyx* very

short, nearly glabrous but with a few stellate hairs and minutely glandular-punctate, very shortly 4-toothed. *Corolla* twice as long as calyx, .1 in.; lobes rounded, sparsely stellate-pubescent and glandular-punctate. *Stamens* long exsert; filaments slender; anthers small; the connective glandular-punctate. *Ovary* rounded, very glandular; style very long, twisted; stigma peltate, large. *Drupe* purple, small, .075 to .1 in. in diam., nearly globose; pyrenes 4. Schauer in DC. Prodr. XI. 641; Benth. Fl. Hongk. 270; Clarke in Hook. f. Fl. Br. Ind. IV. 568. *C. nudiflora*, Hook. and Arn. Bot. Beech. Voy. 206, t. 46.

SINGAPORE: near the Botanic Gardens, Murton 87; Ridley 6884 cult. !—DISTRIB. Tenasserim (?) (*Falconer*); Southern China.

5. *CALLICARPA CANA*, Linn. Mant. 198 (1771). A shrub; branchlets, leaves beneath, and inflorescence covered with a down of whitish or grey or cinnamomeous stellate hairs; branchlets obtusely quadrangular. *Leaves* membranous; ovate, ovate-elliptic or ovate-lanceolate, shortly acuminate at apex, cuneately attenuate at base; upper surface stellate-tomentose when young, afterwards glabrous, shining and dark-coloured, glandular-punctate; lower more or less whitish-grey stellate-tomentose, sometimes glabrescent, sometimes rugose, but more usually softly and conspicuously hairy, glandular-punctate beneath the tomentum; margins glandular-serrate, except at the cuneate base; 4 to 7 in. long, 2 to 3 in. broad; midrib rather slender, pubescent above; main nerves 10 to 12 pairs, impressed above, slightly raised beneath, starting at an angle of 40° to 45° with the midrib and curving upwards to the margin, joined by regular transverse nearly parallel nervules; reticulations netted, impressed above; petiole .25 to .75 in. long, upper part bordered by the decurrent margins of the blade. *Cymes* many-flowered, rounded, scarcely longer than the petioles, dichotomous; peduncles about .25 in. long; bracts linear-subulate, very small; pedicels very short; flowers pale-red. *Calyx* densely white-stellate-tomentose without, glabrous within, .05 in. long; teeth very minute. *Corolla* campanulate; tube glabrous, .075 in. long; lobes rounded, .025 in. long, slightly white-villous without. *Stamens* inserted close to the base of the tube; filaments much exsert, twisted, .15 in. long; anthers .02 in. long; the connective glandular-punctate. *Ovary* somewhat depressed; style decurved, often twisted, as long as filaments; stigma funnel-shaped. *Drupe* globose, under .1 in. long in diam., purple; pyrenes 4. Vahl Symb. III. 12; Roxb. Fl. Ind. I. 392; Wall. Cat. 1834; Blume Bijdr. 817; Dene in Nouv. Ann. Mus. III. 401; Schauer in DC. Prodr. XI. 643; Miq. Fl. Ind. Bat. II. 885; Benth. Fl. Austral. V. 56; Clarke in Hook. f. Fl. Br. Ind. IV. 568. *C. tomentosa*, Lamk. Dict. I. 562. *C. americana*, Lour. Fl. Cochinch. 70, not of Linn. *C. adenanthera*, Br. Prodr. 513,



*C. Heynei*, Roth Nov. Sp. 82; Blume Bijdr. 819. *C. bicolor*, Juss. in Ann. Mus. VII. 77; Schauer in DC. l. c. 642. *C. sumatrana*, Miq. l. c. 886. *C. dentata*, Herb. Roxb., Wall. Cat. 1834, not of Roth.

PENANG: Wallich 1834; Porter; Phillips. NEGRI SEMBILAN: Port Dickson, Sungei Ujong, Ridley 9574. MALACCA: Maingay (K.D.) 1190; Griffith; Ridley 1589. SINGAPORE: Kurz 2908.—DISTRIB. Malay Archipelago, Philippine Islands, Australia.

Clarke in Fl. Br. Ind. does not quote Bot. Mag. 2107, which Bentham had said probably represented a much more woolly plant, though it might be a var. of *cana*. With this we agree.

6. *CALLICARPA PEDUNCULATA*, Br. Prodr. Fl. Nov.-Holl. 513 (1810). A shrub with rather loose tomentum; branchlets stellate-pubescent. *Leaves* membranous; ovate, cuspidate-acuminate at apex, rounded at base; upper surface hispid-puberulous above, especially on the nerves, lower surface thinly whitish-grey stellate-tomentose; margins serrulate on the upper two-thirds; 3 to 6 in. long, 1.5 to 3 in. broad; midrib slender, main nerves about 10 pairs, curving gently upwards to the margin; transverse nervules many and rather prominent; petiole .25 to .5 in. long. *Cymes* rather dense, globose, stellately woolly, on peduncles .25 to .75 in. long; bracts and bracteoles linear subulate; pedicels extremely short. *Calyx* campanulate, about .03 in. long, stellate-pubescent and glandular; teeth short, thick. *Corolla* funnel-shaped, .125 in. long; tube nearly glabrous; teeth rounded puberulous within. *Stamens* inserted at the base of the tube; filaments long exsert, slender; anthers elliptic-reniform, the connective prominently gland-dotted. *Ovary* rounded, glabrous, glandular; style very long; stigma thick, capitate. *Drupe* dark purple, globose, .1 in. in diam.; exocarp smooth. Benth. Fl. Austral. V. 57; Clarke in Hook. f. Fl. Br. Ind. IV. 569. *C. cuspidata*, Roxb. Fl. Ind. I. 394. *C. dentata*, Roth Nov. Sp. 81; Blume Bijdr. 818; Wall. Cat. 6319. *C. cana*, Wall. Cat. 1834, No. 2. *C. lanata*, Schauer in DC. Prodr. XI. 644, not of Linn. or of Vahl. *C. tiliifolia*, Teysm. & Binn. fide Kurz MS.

PENANG: Wallich 1834, 2, 6319.—DISTRIB. Malay Archipelago, Tropical Australia.

7. *CALLICARPA LONGIFOLIA*, Lamk. Dict. I. 563 (1785), and Ill. t. 69 (1791). A shrub, reaching 5 to 6 ft. in height; branchlets, inflorescence, and leaves beneath rather sparsely covered with a short grey or tawny tomentum of stellate hairs; branchlets obtusely quadrangular, slender. *Leaves* membranous; lanceolate, ovate-lanceolate or occasionally oblong-lanceolate, long acuminate at apex, acuminately narrowed at base or rarely almost rounded; upper surface nearly glabrous, lower also some-

times glabrescent, more usually sparsely stellate-hairy; both surfaces gland-dotted; margins serrulate except near the base; 3 to 7 in. long, 1·5 to 3 in. broad; midrib slender but prominent beneath; main nerves 10 to 12 pairs, starting at an angle of 50° to 60° with the midrib and curving upwards to and along the margin, joined by regular parallel transverse nervelets, all nerves and midrib more or less pubescent; petiole ·5 to 1 in. long, slender. *Cymes* dichotomously divaricate-branched, rounded, 1 to 1·5 in. long, and up to 2 in. broad; peduncles ·35 to ·5 in. long; bracts linear-subulate; pedicels slender, short, glabrescent in fruit; flowers pale blue, purplish, pink or white (Benth. in Fl. Austral.). *Calyx* campanulate, ·05 in. long, glandular-dotted and sparsely stellate-hairy; teeth 4, mucronulate. *Corolla* nearly twice as long as calyx, pubescent without, glabrous within; lobes rounded, erect or incurved, about ·025 in. long. *Stamens* inserted at the very base of the tube; filaments long exsert, slender, twisted; anthers ovate-orbicular; the connective prominently gland-dotted. *Ovary* villous; style long, curved, often deflexed; stigma funnel-shaped. *Drupe* white, depressed, glandular, ·05 to ·07 in. in diam.; pyrenes 4. Bot. Reg. t. 864; Roxb. Fl. Ind. I. 394; Brandis For. Fl. 369; Kurz For. Fl. II. 275; Schauer in DC. Prodr. XI. 645, Var. *β floccosa*; Benth. Fl. Austral. V. 57; Miq. Fl. Ind. Bat. II. 887; Koord. & Val. Bijdr. I. 176; Clarke in Fl. Br. Ind. IV. 570. *C. Roxburghiana*, Roem & Sch. Syst. III. Mant. 54. *C. attenuata*, Wall. Cat. 1835. *C. cana*, Wall. Cat. 1834 (*partly*). *C. dentata*, Wall. Cat. 6319 (*partly*).

KEDAH: on Langkawi Island, *Curtis* 2134. PENANG (or SINGAPORE): *Wallich* 1835. PENANG: at waterfall and half-way up hill, *G. King*; *Stoliczka*. PERAK: *Scortechini* 1214; *King's Collector (Kunstler)* 80, 239. MALACCA: *Griffith (K.D.)* 6039; *Maingay (K.D.)* 1191. SELANGOR: *Curtis*. JOHORE: at Jaffaria, *G. King*. SINGAPORE: *Lobb*; *Hullett*; *Cantley* 120; *Schomburgk* 54; *G. Thomson* 44; *Walker* 207; *Deschamps* (cult.).—DISTRIB. Java, Sumatra, Borneo, to North Australia.

## 6. TECTONA, Linn. f.

Trees, stellately tomentose. *Leaves* opposite or whorled, large, entire, petioled. *Flowers* in dichotomous many-flowered cymes, in large terminal panicles; bracts small, narrow. *Calyx* campanulate, shortly 5- to 6-lobed, enlarged and becoming bladder-like in fruit and then ovoid or urceolate. *Corolla* small, white or bluish; tube short; limb with 5 to 6 short subequal spreading imbricate lobes. *Stamens* 5 to 6, attached near the base of the corolla-tube, equal, exserted;

anthers ovate or oblong with distinct parallel cells. *Ovary* fleshy, 4-celled; each cell 1-ovuled, ovules attached near their bases to the axis; style linear; stigma shortly bifid. *Fruit* a drupe enclosed in the accrescent calyx; exocarp spongy-suberose or almost none; endocarp bony, thick, 4-celled. *Seeds* erect, oblong; testa membranous; albumen 0; cotyledons fleshy and oily; radicle short, inferior.—**DISTRIB.** Species 3, one in India and Malaya, one in Burma, the third in the Philippine Islands.

**TECTONA GRANDIS**, Linn. f. Suppl. 151 (1781). A large deciduous tree; branchlets quadrangular, channelled, stellately tomentose, as are the young leaves, leaves beneath and inflorescence. *Leaves* coriaceous-chartaceous; ovate elliptic or obovate, acute or shortly acuminate at apex, rounded acute or cuneate often decurrent at base; upper surface stellate-tomentose when young, afterwards glabrescent, scabrous and punctate with round whitish glands, lower with grey or tawny stellate tomentum; margins entire; 1 to 2 ft. long, 6 in. to 1 ft. broad (leaves of seedlings and coppice shoots often much larger); midrib very stout, much raised beneath; main nerves 8 to 12 pairs, branched and curving upwards, joined by numerous prominent parallel transverse nervules; petiole .5 to 1.5 in. long, very stout, rounded below, the bases of opposite petioles joined by a prominent ridge. *Panicles* 1 to 3 ft. in length and breadth, much spreading, 2- to 3-chotomous; ultimate branches with a sessile fertile flower in the angle; peduncles quadrangular, 0 to 3 in. long; bracts lanceolate or spatulate, lower ones leafy, in pairs at the forks; pedicels very short; flowers white. *Calyx* in flower globose-campanulate, .125 in. long; lobes 5 or 6, .05 in. long, acute; calyx in fruit ovoid, ventricose, reticulate, often 1 to 1.5 in. in diam., with small teeth nearly closing the orifice. *Corolla* white, glabrous, 5 to 6-lobed; tube about .1 in. long; limb spreading; lobes subequal. *Ovary* densely hairy. *Drupe* subglobose, .5 to .75 in. in diam., indistinctly 4-lobed; pericarp soft, with dense felted stellate or branched hairs; endocarp thick, bony. *Seeds* obovoid; testa thin; cotyledons conform with the seed, fleshy; radicle very small. Gaertn. Fruct. I. 275, t. 57; Roxb. Cor. Pl. I. 10, t. 6, and Fl. Ind. I. 600; Wall. Cat. 772; Schauer in DC. Prodr. XI. 622; Dalz. & Gibs. Bomb. Fl. 199; Bocq. Rev. Verb. 99, t. 10; Bedd. Fl. Sylv. Madr. t. 250; Brandis For. Fl. 354, t. 44; Kurz, For. Fl. II. 259; Bl. Bijdr. 820; Miq. Fl. Ind. Bat. II. 901; Clarke in Hook. f. Fl. Br. Ind. IV. 570; Cooke, Fl. Bomb. II. 424; Prain Beng. Plants, 828; Koord. & Val. Bijdr. VII. 165; Briquet in Engl. & Prantl Nat. Pflanzenfam. IV. 3A, 167, t. 63. "*Theka*," Rheede Hort. Mal. IV. 57, t. 27; Rumph. Herb. Amb. III. t. 18.

MALAY PENINSULA: Burma to Malacca, *vide* Fl. Br. Ind. &c.—  
DISTRIB. India, Burma, Siam, Sumatra, Java. The teak-tree, often  
cultivated (MALACCA: *Maingay*, (K.D.) 1193).

We include here the teak-tree, on the authority of the Fl. Br. Ind., but there are  
no specimens from the Malay Peninsula, from wild trees, in either of the herbaria of  
Kew or Calcutta. Mr. Ridley informs us that, so far as he is aware, the teak-tree is  
nowhere indigenous in the Malay Peninsula.

## 7. PREMNA, Linn.

Trees or shrubs, sometimes climbing. *Leaves* opposite or some-  
times in whorls of 4, entire or toothed. *Flowers* in corymbose or  
panicled or sometimes thyrsoid, pubescent, terminal cymes; bracts  
small, narrow; bracteoles 0. *Calyx* small, campanulate, truncate,  
2-lipped or shortly 2- to 5-toothed. *Corolla* small; tube short, often  
villous within; limb 2-lipped, 5-lobed or subequally 4-lobed. *Stamens*  
4 didynamous, inserted below the throat of the corolla-tube, rarely  
exserted; anthers ovate or rounded, the cells parallel or divergent.  
*Ovary* 2- or 4-celled, 4-ovuled; style linear; stigma shortly bifid.  
*Fruit* a small drupe, surrounded below by the calyx, globose or  
obovoid; mesocarp thin, fleshy; endocarp of 1 pyrene, hard, undivided,  
4-celled or by abortion 1- to 3-celled, with a central cavity. *Seeds*  
oblong; testa thin; albumen 0; cotyledons flat; radicle inferior.—  
DISTRIB. Species 40 or more, in the warmer regions of the Old  
World.

Calyx clearly 2-lipped:—

Upper lip of calyx 3-lobed; lower 2-lobed:—

Leaves prominently crenate-dentate, ovate or ovate-deltoid,  
cordate .. .. . 1. *P. littoralis*.

Leaves entire or very obscurely and distantly toothed, ovate .. .. . 2. *P. flavescens*  
var. *rubens*.

Upper lip of calyx 2-lobed:—

Lower lip of calyx entire or obscurely lobed; corolla-tube  
funnel-shaped:—

Cymes in panicles of interrupted spikes; leaves subsessile 3. *P. Derryana*.

Cymes in corymbose panicles: leaves petioled:—

Corymbs small, under 2 in. in diam.; leaves under 3·5 in.

long .. .. . 4. *P. integrifolia*  
var. *angustior*.

Corymbs rather large, reaching 5 in. in diam.; leaves  
over 3 in. long. .. .. .

Corymbs lax:—

Main nerves of leaves 6 to 8 pairs; leaves acuminate  
at apex, truncate or cordate at base; calyx-tube  
puberulous .. .. . 5. *P. fetida*.

Main nerves of leaves 5 to 6 pairs; leaves obtuse or very shortly acute or acuminate at apex:—

- |                                                                        |                            |
|------------------------------------------------------------------------|----------------------------|
| Leaves ovate or elliptic, membrano-chartaceous ..                      | 6. <i>P. divaricata</i> .  |
| Leaves obovate or orbicular, chartaceous ..                            | 7. <i>P. trichostoma</i> . |
| Leaves elliptic or elliptic lanceolate, coriaceous-chartaceous .. .. . | 8. <i>P. perakensis</i> .  |

Main nerves of leaves 4 to 5 pairs, leaves broadly elliptic .. .. .

9. *P. punctulata*.

Corymbs compact:—

Corymbs 3 in. in diam.; leaves membranous, ovate-acuminate, cordate or truncate at base, yellowish-brown when dry .. .. .

10. *P. cordifolia*.

Corymbs 4 to 5 in. in diam.; leaves coriaceous, elliptic or elliptic-lanceolate, shortly acuminate at apex, attenuate at base; reddish-brown when dry

11. *P. Wrayi*.

Corymbs 8 in. in diam.; leaves membranous, broadly ovate, acuminate at apex, truncate or cordate at base; reddish-brown when dry. .. .. .

12. *P. sterculifolia*.

Lower lip of calyx 2-lobed, calyx-tube subquadrangular; leaves under 3 in. long; corymbs rather small; corolla-tube slender .. .. .

13. *P. Ridleyi*.

Calyx not 2-lipped:—

Calyx truncate or very obscurely lobed; leaves coriaceous, elliptic, obtuse at apex, rounded at base .. .. .

14. *P. Kunstleri*.

Calyx subequally 5-lobed; leaves large, stellate tomentose, as are branchlets and inflorescence .. .. .

15. *P. pyramidata*.

1. *PREMNA LITTORALIS*, King & Gamble in Kew Bull. 107 (1908). A small tree; branchlets nearly as thick as a goosequill, obscurely angled, tawny-pubescent, with small lenticels; the nodes marked by a ridge connecting the petioles. *Leaves* chartaceo-coriaceous; ovate or ovate-deltoid, acuminate at apex, cordate at base, the sinus .25 to .5 in. deep; both surfaces glabrous except the nerves, which are puberulous; margins acutely crenate-dentate except in the curves of the sinus; 4 to 6 in. long, 2 to 3 in. broad; midrib strong, raised beneath; main nerves 7 to 9 pairs, the lowest 1 to 2 pairs starting from the base and divaricate, the rest starting at an angle of about 50° with the midrib and curving upwards; transverse nervules distant, few, not prominent; petiole 1 to 1.5 in. long, slender, puberulous. *Cymes* in terminal, spreading, 3-chotomous, tawny-pubescent corymbs, reaching 4 in. in length and 6 in. in breadth; peduncles .75 to 1 in. long; primary branches up to 1.5 in. long, rest gradually shorter; bracts linear, persistent, the lowest sometimes leaf-like; pedicels very short, with a pair of minute bracteoles below the calyx; flowers very pale green. *Calyx* .75 to 1 in. long, 2-lipped, upper shortly 3-lobed, lower longer, 2-lobed; lobes rounded; tube pubescent without. *Corolla* 2-lipped, half as long

again as the calyx; upper lip broad, bifid, lower 3-lobed, the midlobe longest; all lobes rounded; tube glabrous without, also within except the belt of thick villous hairs just below the mouth. *Stamens* (in bud) included; filaments short, thick; anthers reniform, very shortly 1- to 2-mucronate. *Ovary* subglobose, depressed, glabrous except for a few glandular scales; style thick; stigma very shortly 2-fid. *Drupe* globose, glabrous, fleshy; endocarp tuberculate; cells 4, one only usually fertile. *Seed* oblong, acute at each end; testa membranous with a corky outer layer; cotyledons shortly oblong, obtuse, cordate, .05 in. long, fleshy.

PERAK: sea-coast at Matang, Wray 2719.

2. *PREMNA FLAVESCENS*, Ham.; Wall. Cat. 2649 (1828); Clarke in Hook. f. Fl. Br. Ind. IV. 578; Prain Beng. Plants, 831.

*VAR. rubens*, Clarke in Hook. f. Fl. Br. Ind. IV. 578 (1885). A shrub or small tree (a climber—*Koorders & Valetton*); branchlets the size of a crow-quill, grey-pubescent, obscurely angled. *Leaves* chartaceous when dry; ovate or ovate-oblong, acuminate at apex, cordate or rounded or somewhat cuneate at base; upper surface shining, sparsely setulose especially on the nerves, lower surface tawny-pubescent; entire or the upper half obscurely and distantly toothed; 4 to 6 in. long, 2 to 2.5 in. broad; midrib rather stout, raised beneath; main nerves 6 to 9 pairs, the lowest 1 or 2 (first very small) pairs from the base, at an angle of about 40° with the midrib, curving upwards to and along the margin, the upper ones joining in an intramarginal looped nerve which ends in the midrib at the acumination; transverse nervules many, conspicuous on the lower surface; petiole 1 to 1.5 in. long, slender, puberulous. *Cymes* in terminal tawny-pubescent corymbs about 4 in. in diam.; branches 3- then 2-chotomous; peduncle 1 to 2 in. long; bracts small, linear; pedicels short, under .05 in. long; flowers greenish. *Calyx* campanulate, .05 to .1 in. long, pubescent without, 2-lipped, upper lip 3-lobed, lower 2-lobed, all lobes obtuse, nearly equal; fruiting calyx saucer-shaped. *Corolla* funnel-shaped, .1 to .15 in. long, 2-lipped, upper lip shortly bilobed, reflexed, lower 3-lobed, the midlobe longest and oblong; tube much villous-hairy within. *Stamens* exsert; filaments flattened; anthers reniform, the cells nearly parallel. *Ovary* glabrous, depressed; style slender, as long as the stamens; stigma 2-lobed, the lobes slender, horizontally spreading. *Drupe* globose, .15 to .2 in. in diam., with numerous shining glands; endocarp tuberculate. *Seed* oblanceolate, about .1 in. long, usually one only in each drupe; cotyledons fleshy, ovate-oblong; radicle thick. *P. lucidula*, Miq. Fl. Ind. Bat. II. 898; Koord. & Val. Bijdr. VII. 188.

MALACCA: Ayer Punnas, Griffith (K.D.) 6020. — *DISTRIB.* Burma,

Java (*Teysmann* No. 10; *Zollinger* 645; *Koorders* 31425  $\beta$ ), Sumatra (*Forbes* 2621—a climbing shrub).

3. *PREMNA DERRYANA*, King & Gamble in *Kew Bull.* 107 (1908). A climbing (?) shrub; branchlets smooth, brown, with large circular or elliptic lenticels. *Leaves* membranous when dry, subsessile; elliptic or obovate, shortly and obtusely acute at apex, attenuate and obscurely auricled at base; both surfaces shining, glabrous; margins entire; 5 to 8 in. long, 3.5 to 4 in. broad; midrib slender, impressed above, raised beneath; main nerves 7 to 8 pairs, often branched, curving upwards to and along the margin where they anastomose; transverse nervules slender, and with the minor reticulations rather prominent. *Cymes* in terminal panicles of three to four spikes, each spike with many interrupted glomerules of sessile flowers, the inflorescence 6 to 8 in. long; main peduncles 2 to 2.5 in. long, secondary peduncles .75 to 1 in. long; bracts lanceolate, at the main divisions, .25 in. long. *Calyx* deeply bilabiate; the upper lip entire at first, afterwards 2-lobed, .125 in. long, the lower one entire, .1 in. long; tube golden-pubescent without. *Corolla*-tube rather longer than the calyx, glabrous except for a few villous white hairs in the throat within; lips 2, posterior lip emarginate, erect, anterior lip 3-lobed, the lobes obtuse, the midlobe the longest. *Stamens* 4 long exsert; filaments puberulous, twisted; anthers reniform; cells opening by oblong pores. *Ovary* glabrous, depressed; cells 4, one only apparently seed-bearing; style slender, as long as the stamens; stigma of 2 slender horizontal lobes. *Drupe* not seen.

PERAK: on Larút Hills, *Derry* (*Curtis* 3701).

4. *PREMNA INTEGRIFOLIA*, Linn. Mant. II. 252 (1771); *Cooke Fl. Bomb.* II. 426; *Prain Beng. Plants*, 830. *P. serratifolia*, Linn. *l. c.* 253; *Schauer in DC. Prodr.* XI. 632; *Bedd. For. Man. in Flor. Sylv. CLXXII.*; *Trimen Fl. Ceyl.* III. 352. *P. spinosa*, Roxb. *Fl. Ind.* III. 77. *P. sambucina*, Wall. Cat. 1775; *Schauer, l. c.* 631. "*Gumira littorea*," *Rumph. Herb. Amb.* III. 209, t. 134.

*VAR. angustior*, *Clarke in Hook. f. Fl. Br. Ind.* IV. 574 (1885). A small shrub, 3 to 6 ft. in height; branchlets nearly glabrous, the size of a crow-quill, terete. *Leaves* elliptic or elliptic-ovate, obtusely acute at apex, rounded or narrowed at base; glabrous on both sides except on the midrib and main nerves; margins entire or obscurely crenate-dentate in the upper half; 2 to 3.5 in. long, 1 to 2 in. broad; midrib slender, puberulous above and raised, tawny-villous along the sides and in the axils below; main nerves 4 to 5 pairs, lowest 2 pairs rather close to the base and long, the rest more spreading and curved upwards to join in an obscure intramarginal looped nerve; few transverse nervules and reticulations obscure; petiole slender, puberulous, .25 to .5 in. long.

*Corymbs* puberulous, terminal or pseudo-axillary in upper axils, up to 2 in. broad; sessile or on peduncles up to 1·5 in. long; branches at first 3- afterwards 2-chotomous; bracts minute, lanceolate; pedicels very short; flowers greyish-white. *Calyx* 2-lipped; upper lip with 2 triangular lobes, lower obtuse, obscurely 2- to 3-dentate; tube rugose and puberulous without, .05 in. long. *Corolla*-tube cylindric, .1 in. long, puberulous; limb 2-lipped; upper lip subequally 3-lobed, the middle lobe slightly the longest and incurved; lower lip rounded obtuse, rather shorter, scarcely .05 in. long; upper half of tube within thickly white-villous. *Stamens* slightly exsert; anther-cells slightly divaricate. *Drupe* obovoid, depressed at top, rugose and obscurely ribbed, .15 in. long; endocarp ribbed, bony, 4-celled. *Seeds* ovoid, acute; testa pale, slightly corky; cotyledons flat, shallowly emarginate at top.

KEDAH: Langkawi Island, *Curtis* 2955. PENANG: *Kunstler* (*King's Collector*) 1670; *J. Scott*. PROVINCE WELLESLEY: at Batu Kawan, *Ridley* 9353. MALACCA: *Griffith* (K.D.) 6030; *Maingay* (K.D.) 1201. SINGAPORE: *Ridley* 8900.—DISTRIB. Amherst in Tenasserim, *Falconer*; tidal forests of Tavoy, *W. A. Hearsey*.

5. *PREMNA FÆTIDA*, Reinw. ex Blume Bijdr. 816 (1825). A large shrub or small tree with spreading branches, reaching 20 to 30 ft. in height; bark white; branchlets subtetragonous to cylindric, tawny-pubescent, as are the young leaves, the nerves of the mature leaves, and the inflorescence; nodes with a prominent villous ridge joining the bases of the petioles. *Leaves* chartaceous; ovate, sometimes ovate-lanceolate, rarely ovate-oblong, shortly acuminate at apex, rounded or truncate or slightly cordate at base; shining on the upper surface and dark when dry; paler, often almost grey on the lower surface; margins entire or slightly repand above; 3 to 6 in. long, 2 to 3·5 in. broad; midrib slender, prominent beneath; main nerves 6 to 8 pairs, the lowest 2 pairs almost from the base, the lowest spreading, the rest at about 45° with the midrib, gently curving to and along the margin; transverse nervules rather distant, irregular; petiole .75 to 2 in. long. *Corymbs* lax, reaching 5 in. long and broad, subsessile or on about 1 in. long peduncles, 3-chotomous below, 2-chotomous above; the branches divaricate; bracts very small, linear; pedicels short, under .05 in. long; flowers white. *Calyx* cup-shaped, .05 to .075 in. long, 2-lipped, upper lip acutely 2-lobed, lower very shortly 3-lobed; tube puberulous without. *Corolla*-tube funnel-shaped, .1 in. long, densely white-villous in the upper half within; obscurely 2-lipped, upper lip short, lower 3-lobed, recurved, the midlobe longest and incurved. *Stamens* attached to the throat of the corolla-tube, shortly exsert; anther-cells elliptic with elliptic pores.



*Ovary* depressed, glabrous; style short; stigma very shortly bifid. *Drupe* globose, 4-sulcate; epicarp rugose; cells 4, all or fewer with seeds. *Seeds* fusiform, keeled; testa pale. Schauer in DC. Prodr. XI. 630; Miq. Fl. Ind. Bat. II. 891; Koord. & Val. Bijdr. VII. 192. *P. opulifolia*, Miq. l. c. 898. *Gumira foetida*, Hassk. in Florã, 25 beibl. p. 26. "*Gumira domestica*," Rumph. Herb. Amb. III. 208, *fide* Miq. & Schauer.

KEDAH: near sea-level, *Kunstler* (*King's Collector*) 1737. PERAK: on the coast at Matong, *Wray* 2493; near sea-level, *Kunstler* (*King's Collector*) 1016. JOHORE: at Batu Pahat, *Ridley* 11137. SINGAPORE: cult., *Ridley* 6893.—DISTRIB. Java (*Koorders* 20179  $\beta$ ; *Zollinger* 2740); Borneo (*Haviland & Hose* 3394, &c.).

We follow *Koorders & Valetton* in putting *P. opulifolia*, Miq., under *P. foetida*, Reinw. But our specimens agree better with the description of *P. opulifolia* than with those of *P. foetida*. As pointed out by *Koorders & Valetton*, the description of the calyx given for *P. foetida* as "obsolete sub-4-dentatus, vulgo 3-denticulatus, quarto dente abortivo" is abnormal. That given for *P. opulifolia* is quite correct.

6. *PREMNA DIVARICATA*, Wall. Cat. 1781 (1828). A climbing shrub; branchlets slender, terete, nearly black when dry, with sparse rounded or oblong lenticels. *Leaves* membranous when young, chartaceous when older; ovate or elliptic, briefly acute or bluntly acuminate at apex, rounded or attenuate sometimes subcordate at base; upper surface slightly shining, glabrous except the nerves; lower dull, glabrous except for villous hairs along the midrib and in the axils of the main nerves, obscurely dotted; entire; 3 to 5 in. long, 2 to 3.5 in. broad; midrib slender, slightly impressed above; main nerves 5 to 6 pairs, at an angle of 40° to 60° with the midrib, the lowest 1 to 2 pairs from near the base, curved upwards to join in loops near the margin; transverse nervules few, irregular, inconspicuous, as are the finely netted reticulations; petiole .5 to 1.5 in. long, channelled above. *Corymbs* divaricate, many-flowered, slightly puberulous, terminal, reaching in fruit 5 in. in diam., sessile or on peduncles 1 to 2 in. long, 3-chotomous below, 2-chotomous above; bracts linear-lanceolate, small, the lowest sometimes leafy; pedicels very short; flowers greenish-white. *Calyx* cup-shaped, prominently 2-lipped, the upper lip much longer than the lower, with 2 rounded .03 in. long lobes; the lower entire or shortly 3-toothed; tube rugose without and glandular-dotted. *Corolla*-tube cylindric, .075 in. long, puberulous without, white-villous within on the upper half; limb 2-lipped; upper lip short, retuse, broad; lower lip 3-lobed, the midlobe longest, up to .075 in. *Stamens* inserted near the mouth of the corolla-tube, slightly exsert; anther-cells divaricate.

*Ovary* rounded; style as long as stamens; stigma very shortly bifid. *Drupe* ovoid, .25 in. long; epicarp smooth; pericarp fleshy; endocarp ribbed; pyrenes 3- to 4-celled. Schauer in DC. Prodr. XI. 681; Clarke in Hook. f. Fl. Br. Ind. IV. 575. *P. lucidula*, Kurz For. Fl. II. 263, not of Miq.

PENANG: beach at Tanjong Bunga, Curtis 215. DINDINGS: Pangkore Island, Ridley 7180. MALACCA: Maingay (K.D.) 1198-9; at Sungei Hudang, Goodenough 1350. SINGAPORE: gardens in scrub, Ridley 10841.—DISTRIB. Java.

7. *PREMNA TRICHOSTOMA*, Miq. Fl. Ind. Bat. II. 892 (1856). A large climbing shrub, reaching to a considerable height, the stem reaching 3 to 5 in. in diam.; branchlets thick, shining, glabrous, pale brown. *Leaves* at first chartaceous, afterwards subcoriaceous, very variable; ovate- or obovate-elliptic, sometimes nearly orbicular, shortly acuminate at apex or sometimes attenuately acute, rounded or subcordate or cuneate at base; glabrous on both surfaces except on the nerves; margins entire or sometimes undulate at apex; 4 to 7 in. long, 2 to 5 in. broad; midrib slender, raised beneath; main nerves 5 to 6 pairs, at from 30° to 45° with the midrib, the lowest pair from the base, the next rather close, the rest distant, all straight at first, then branched outwards and curved to join near the margin, raised on both surfaces when old; transverse nervules many; petiole .75 to 1 in. long, puberulous. *Corymbs* terminal, reaching 4 to 5 in. in diam., puberulous, sessile or on 1 in. long peduncles; branches 3- afterwards 2-chotomous, thickening in fruit; bracts lanceolate, short; pedicels none; flowers cream-coloured. *Calyx* cup-shaped, obscurely tetragonous, puberulous without, .05 to .07 in. long, 2-lipped, the upper lip 2-lobed, the lower faintly 2-toothed or entire; all teeth less prominent in fruit. *Corolla* campanulate; tube .1 in. long, densely villous within in the upper half; limb subequally 4-lobed, the lobes rounded, lower one slightly smaller, all recurved. *Stamens* inserted at the mouth of the corolla-tube, long exsert; filaments slightly flattened; anther-cells small, rounded, didymous, opening by elongated pores. *Stigma* 2-fid, the divisions divaricate, rather long. *Drupe* pyriform, 4-celled, one cell only enlarged and seed-bearing. *Seeds* oblong, flattened; testa membranous. Koord. & Val. Bijdr. VII. 184. *P. parasitica*, Clarke in Hook. f. Fl. Br. Ind. IV. 574, not of Blume.

KEDAH: Langkawi Island, Curtis 2796. PERAK: at waterfall, 300 ft., Wray 2403; King's Collector 3008, 10310; Scortechini 192. MALACCA: Griffith 6019. JOHORE: Ridley 11136. SINGAPORE: Ridley 5026, 6828, 8914.—DISTRIB. Borneo (Haviland).

8. *PREMNA PERAKENSIS*, King & Gamble in Kew Bull. 107 (1908).

A shrubby climber; branches brown, sparsely lenticellate, glabrous, smooth. *Leaves* chartaceo-coriaceous; elliptic-oblong or -lanceolate, sometimes -obovate, shortly and bluntly acute at apex, narrowed or cuneate at base; both surfaces glabrous, even the nerves, slightly rugose; margins entire, slightly recurved; 3 to 5 in. long, 1·5 to 2·25 in. broad; midrib stout, impressed above, raised beneath; main nerves 5 to 6 pairs, also impressed above and raised beneath, the lowest pair opposite and from close to the base, starting at from 25° to 40° with the midrib and nearly straight, curving only near the margin where they form a looped intramarginal nerve; transverse nervules many, inconspicuous; petiole ·5 to ·75 in. long, glabrous, channelled above. *Corymbs* spreading, tawny-puberulous, reaching 6 in. in length and in diam., 3-chotomous, afterwards 2-chotomous, sessile or on stout peduncles 2 to 3 in. long; bracts ovate-lanceolate, those of lower divisions leafy; pedicels 0; flowers pale green with white stamens. *Calyx* obscurely quadrangular, pubescent, nerved, the nerves prominent in fruiting examples, ·06 in. long; 2-lipped, the upper lip 2-lobed, the lower entire or obscurely 2-lobed. *Corolla* funnel-shaped; the tube ·125 in. long, densely white-villous in the upper half; limb subequally 4-lobed, the lobes recurved, ciliate. *Stamens* inserted at the mouth of the corolla-tube, long exsert; filaments somewhat flattened; anther-cells nearly globose, didymous, opening by circular pores; connective glandular. *Ovary* glabrous; style long exsert; stigma divaricately 2-fid. *Drupe* smooth, pyriform, one cell only fertile. *Seed* ovate-oblong, flattened; testa membranous.

PERAK: in rocky places in forest, at 800 to 1000 ft., *King's Collector* 7247, 10738; *Scortechini* 516.

This species comes very near to *P. trichostoma*, but has several important points of difference, such as the narrower, thicker leaves with glabrous nerves, the darker branches, the markedly nervose fruiting calyx, the large bracts, and the round openings of the anther-cells, so that we have preferred to describe it as a species instead of as a variety. In the corolla it nearly agrees, as also it does in the absence of pedicels and the one-seeded, pyriform drupe.

9. *PREMNA PUNCTULATA*, Clarke in Hook. f. Fl. Br. Ind. IV. 575 (1885). A shrub or small tree; branchlets dark brown, terete, lenticellate. *Leaves* chartaceous; broadly elliptic, suddenly shortly acuminate at apex, rounded at base; upper surface glabrous, shining, lower surface paler, reddish, punctulate, pubescent on the nerves; margins entire; 4 to 6 in. long, 2 to 3 in. broad; midrib prominent; main nerves 4 to 5 pairs, the lowest pair very small, close to the base, the next pair a little above, the rest more distant, all curving upwards to

anastomose near the margin; transverse nervules very prominent, as is the netted reticulation; petiole 1 in. long, slender, channelled above. *Corymbs* many-flowered, terminal, paniculate, pubescent, 4 to 5 in. in diam.; lower bracts .5 in. long, linear-oblong; pedicels very short or none. *Calyx* .06 in. long, minutely grey-pubescent and glandular, 2-lipped, upper lip 2-toothed, lower lip also 2-toothed or subentire. *Corolla* tubular, .1 in. long, villous at the throat within, glabrous below; lobes short, rounded. *Stamens* included; filaments inserted in the middle of the tube, short; anthers reniform; cells slightly divergent. *Ovary* glabrous; style rather short; stigmatic lobes slender, recurved. *Drupe* not known.

MALACCA: *Maingay* (K.D.) 1200.

10. *PREMNA CORDIFOLIA*, Roxb. Fl. Ind. III. 78 (1832). A shrub, reaching 8 to 12 ft. in height, with dark brown bark on the old wood; branchlets light brown, darker when dry, the size of a crow-quill, glabrous, terete. *Leaves* membranous; ovate or ovate-cordate, acuminate at apex, rounded or cordate at base; upper surface shining, bullate, drying brown, glabrous except on the midrib and main nerves; lower surface also nearly glabrous, yellowish-brown when dry; margins entire, slightly recurved; 3 to 7 in. long, 2 to 3 in. broad; midrib slender, but strongly raised beneath; main nerves 5 to 6 pairs, at about 50° with the midrib, at first nearly straight and then curving to join in a looped intramarginal nerve, each pair on the same side joined by few (4 to 5) irregular transverse nervules and lesser reticulations; petiole slender, .5 to 1 in. long; upper side tawny-puberulous. *Corymbs* many-flowered, dense, terminal, tawny-puberulous, about 3 in. long, and the same or rather more in diam.; peduncles 1 to 3 in. long, with tawny-puberulous leaf-like bracts; bracts of corymb small, lanceolate, acute; branches at first decussate, then dichotomous; pedicels very short, rather thick; flowers greyish-white. *Calyx* .1 in. long, 2-lipped; upper lip 2-lobed, lower entire; lips short, broad, rounded. *Corolla*-tube .2 in. long, funnel-shaped, densely villous within; limb 2-lipped; anther-cells shortly divergent. *Ovary* glabrous; style as long as corolla-tube. *Drupe* obovoid, slightly depressed at top; exocarp thin, shining, black; mesocarp fleshy; endocarp hard, pitted, 3- to 4-celled, one cell usually only fertile. *Seed* ovoid acute; cotyledons flat, orbicular, .125 in. in diam. Walp. Rep. IV. 94; Schauer in DC. Prodr. XI. 632, *partly, not of Wight or Bedd.*; Miq. Fl. Ind. Bat. II. 895, *in part only*; Clarke in Hook. f. Fl. Br. Ind. IV. 572.

PENANG: at Tanjong Bunga, *Curtis* 861; *Kunstler* (*King's Collector*) 1480. PROVINCE WELLESLEY: at Krian, *Ridley* 9386. SINGAPORE: *Lobb*.

11. *PREMNA WRAYI*, King & Gamble in Kew Bull. 108 (1908). A climbing nearly quite glabrous shrub; branches stout, obscurely quadrangular, dark brown; branchlets similar, darker, smooth. *Leaves* coriaceous; elliptic or elliptic-lanceolate, gradually acuminate at apex, attenuate at base, often unequally; shining and glabrous on both surfaces except for small tufts of hair in the axils of the main nerves beneath, olive-brown when dry; entire; 4 to 8 in. long, 2 to 4 in. broad; midrib stout, impressed above, prominently raised beneath; main nerves 6 to 8 pairs, impressed above, raised beneath, the lowest pair very faint from the base and close to the margin, the next stout and shortly above, the rest distant at about  $50^{\circ}$  with the midrib, curving upwards to and along the margin, the upper ones joined in a looped intramarginal nerve; transverse nervules straight and fairly regular; reticulations rather prominent on the upper surface when dry; petiole .5 to 2 in. long, channelled above. *Corymbs* dense and compact, about 4 to 5 in. broad at top, glabrate or very minutely puberulous on upper branches and calyx; lower branches 3-chotomous, upper 2-chotomous, much ramified and curving inwards; peduncle about 1 in. long, stout; main branches 1 to 1.5 in. long; bracts very small, linear, the lower ones leafy; pedicels about .05 in. long to the joint below the calyx-tube. *Calyx* deeply 2-lipped; the upper lip sharply 2-lobed, the lower 3-toothed; the lobes spreading in the fruiting stage; tube rugose. *Corolla* not seen. *Drupe* obovoid, .25 in. long and broad; epicarp rugose, glandular-dotted; pyrenes 4. *Seeds* plano-convex, ovate, .175 in. long; testa white-corky; cotyledons oblong, retuse at tip, flat, fleshy, .15 in. long; radicle .025 in.

PERAK: at Tapa, Wray 200.

At first sight this species resembles *P. Kunstleri* in its coriaceous shining leaves and stout branches, but differs in the more compact corymbs and the deeply lobed calyx.

12. *PREMNA STERCULIFOLIA*, King & Gamble in Kew Bull. 108 (1908). A stout, tree-like, climbing shrub; branches reddish-brown, smooth; branchlets terete, purple, sparsely scabridly puberulous. *Leaves* membranous; ovate, acuminate at apex, truncate or somewhat cordate at base; both surfaces reddish-brown when dry; upper sparsely setulose and pubescent on the nerves, lower slightly puberulous, sparsely glandular-dotted; 4 to 9 in. long, 3 to 5 in. broad; midrib prominent, channelled above, raised beneath; main nerves 6 pairs, raised beneath, the 2 lowest pairs from close to the base spreading, the rest at about  $40^{\circ}$  with the midrib, curved upwards to and along the margin, joined by prominent transverse nervules; petiole 2 to 4 in. long, channelled above. *Cymes* in large spreading, slightly puberulous

many-flowered panicle corymbs reaching 9 in. long and 8 in. broad; peduncles stout, 3 to 4 in. long; branches 3-chotomous at first, afterwards 2-chotomous; ultimate cymules crowded; bracts linear, very small, caducous; pedicels short, slender; flowers pale green. *Calyx* campanulate, obscurely 2-lipped; the upper lip nearly entire, the lower entire or obscurely toothed; tube .05 in. long, glandular and puberulous, scaly without. *Corolla*-tube funnel-shaped, puberulous, .125 in. long, densely white-villous within except at the base; 2-lipped, upper of 1 short recurved lobe, lower of 3 recurved obtuse lobes, the midlobe the longest, .075 in. long. *Stamens* exsert; the filaments twisted; anthers ellipsoid, divaricate. *Ovary* glabrous, depressed; style slender, nearly .25 in. long; stigma bifid with slender spreading lobes. *Drupe* globose, depressed, much tuberculate and red when dry; pyrene woody, tuberculate, roughly 4-angled. *Seeds* usually 1 only perfect, obovate, .1 in. long; testa membranous; cotyledons conform to the seed, fleshy; radicle pointed.

PERAK: at waterfall, Wray 1828; *Scortechini*; *King's Collector* 3067, 7531, 8373.

VAR. *cordata*, King & Gamble, *l.c.* *Leaves* more deeply cordate at base; branches of inflorescence more distant than in type; calyx with upper lip 2-lobed, the lower entire or obscurely toothed.

PERAK: *Scortechini* 273.

13. *PREMNA* RIDLEYI, King & Gamble in Kew Bull. 109 (1908). A climbing shrub; branches stout, with grey shining bark; branchlets slender, terete, brown. *Leaves* chartaceous, opposite or sometimes one of each pair rather higher than the other; ovate, ovate-oblong or slightly obovate, rounded or very shortly acute at apex, rounded or attenuate often unequally at base; both surfaces glabrous and dull; margins entire; 1.5 to 3 in. long, .75 to 1.5 in. broad; midrib slender; main nerves 6 to 7 pairs, the lowest 1 or 2 pairs from the base, at an angle of 30° to 40° with the midrib, straight at first, then gently curved to and along the margin; transverse nervules and reticulations faint; petiole slender, .25 to .5 in. long. *Corymbs* terminal, 1.5 to 5 in. long, and 2 to 5 in. broad, many-flowered, tawny-puberulous; peduncles .75 to 2 in. long; branches at first 3- afterwards 2-chotomous; bracts linear-lanceolate, small; pedicels none or minute; flowers greenish-white. *Calyx* campanulate, subquadrangular, 2-lipped, each lip 2-lobed, with minute teeth; tube .05 in. long, puberulous. *Corolla*-tube somewhat tubular, slender, .1 in. long, puberulous in the lower half within, long white-villous in the upper; lobes 4, equal, oblong, rounded at tip, .05 to .075 in. long, incurved at length. *Stamens* inserted, 2 upper at the top of the throat of the corolla-tube, 2 lower lower down; filaments slightly flattened, long exsert; anthers small; cells rounded, slightly

divaricate; connective glandular on the back. *Ovary* rounded, glabrous; style as long as stamens, .2 in.; stigma bifid; the lobes .025 in. long, usually recurved. *Drupe* not seen.

PERAK: *Scortechini* 455. SINGAPORE: garden jungle, *Ridley* 6826.

14. *PREMNA KUNSTLERI*, King & Gamble in Kew Bull. 109 (1908). A large shrub or small tree, nearly quite glabrous, sometimes climbing; branches stout, thick, purplish-brown; branchlets the size of a quill, terete, glabrous, sparsely lenticellate. *Leaves* coriaceous, elliptic, sometimes elliptic-oblong or obovate, obtuse at tip with a short blunt abrupt acumination, rounded or subcordate at base; both surfaces glabrous, more or less shining when dry; margins entire, slightly recurved; 4 to 7 in. long, 2.5 to 4 in. broad; midrib very stout, impressed above, raised prominently beneath; main nerves 5 to 7 pairs at from 50° to 60° with the midrib, the lowest pair small, from the base, the second from close above it, the rest more distant, all curved upwards to join in a looped intramarginal nerve and joined by four irregular transverse veinlets; reticulations minutely netted, forming a prominent network on the upper surface when dry; petiole .75 to 1.25 in. long, smooth but channelled above. *Corymbs* terminal, spreading, long-branched, 3-chotomous below, 2-chotomous above, glabrous except for very minute spare tawny pubescence on the upper branches and calyx-tube, sessile or pedunculate, the peduncle or primary branches 3 to 4 in. long, the whole corymb reaching 7 in. in length and 5 in. in breadth; bracts linear or linear-lanceolate, the lower ones leafy; pedicels very short, less than .05 in. to the joint under the calyx-tube; flowers pale greenish-white. *Calyx* cup-shaped, .075 in. long, truncate or very obscurely 2-lipped, in fruit very shallow and almost quite entire. *Corolla*-tube tubular, .125 in. long, the lower half glabrous and almost hyaline, the upper shortly white-villous; limb 2-lipped, lower lip 3-lobed, the midlobe longest, the two others and the upper lip equal, all erect or incurved. *Stamens* shortly exsert, attached just below the mouth of the corolla-tube; anther-cells rounded, slightly divaricate, pores elliptic. *Ovary* glabrous, depressed, 4-celled; style as long as stamens; stigma very shortly bifid. *Drupe* obovoid, faintly ribbed, .25 in. long; epicarp smooth, waxy-white (*Kunstler*); pyrenes 4-celled, one or more cells fertile. *Seeds* obovate, plano-convex, .15 to .2 in. long; testa white, corky; cotyledons flat, fleshy, .15 in. long, .1 in. broad, retuse at tip; radicle minute.

PERAK: on low ground, under 500 ft. in alt. *King's Collector* 938, 4723, 5949. MALACCA: at Sungli Udang, *Goodenough* 1350.

To this species we also refer *Forbes'* No. 1424 from the Lampongs, Sumatra, but the leaves reach over 8 in. in length and 5 in. in breadth with slightly attenuate bases, and the fruiting calyx is rather more 2-lipped.

15. *PREMNA PYRAMIDATA*, Wall. Cat. 1779 (1827). A small or medium-sized tree (a large tree—*Wallich*), reaching 40 to 50 ft. in height, and up to 5 ft. in girth; bark light greyish-brown; branches stout, pale brown; branchlets obscurely quadrangular, stellately tomentose with tawny tomentum. *Leaves* chartaceous; ovate, acuminate at apex, cordate or rounded sometimes attenuate at base; both surfaces brown when dry, the upper dark glabrous except on the nerves, the lower pale glabrescent; margins entire; 6 to 14 in. long, 3 to 8 in. broad; midrib stout, stellate-tomentose on both surfaces; main nerves 7 to 10 pairs, the lowest two pairs from near the base, the rest distant at an angle of about 60° with the midrib, curving gently upwards and joined by many regular transverse nervules very prominent on the under surface; petiole 1 to 4 in. long, channelled above, stellately scurfy-pubescent. *Cymes* in large terminal stellately-pubescent pyramidal panicles or corymbs, reaching 12 in. in length, and 6 to 9 in. in breadth; common peduncle 1 to 3 in. long; branches at first 3- afterwards 2-chotomous, usually ascending; bracts many, linear, reaching .5 in. long; flowers crowded at the ends of the branches on very short pedicels, greenish-white. *Calyx* campanulate, glabrous within, stellately-pubescent without; tube .075 in. long; teeth 5, subequal, about .025 in. long, the posterior three thickened, the two anterior shorter and more slender. *Corolla* bilabiate, .15 to .2 in. long; upper lip broad; lower lip 3-lobed, the midlobe the longest and spreading, the side lobes shorter and more obtuse, usually incurved; tube with a ring of retrorse stiff hairs at the throat, otherwise glabrous. *Stamens* 4, included; anther-cells elliptic, slightly divaricate; filaments stout. *Ovary* glabrous, depressed; style thickened with very shortly bifid stigma. *Drupe* globose or obovoid, glabrous, depressed at top, .2 to .25 in. in diam.; pericarp fleshy; pyrene rugose, very hard, 4-celled. *Seed* usually 1 only, oblong. Schauer in DC. Prodr. XI. 633; Miq. Fl. Ind. Bat. II. 897; Hook. f. Fl. Br. Ind. IV. 576. *P. tomentosa*, Kurz For. Fl. II. 260.

PERAK: Wray 3691; *Scortechini*; at Kwala Dipang, Ridley 9699; *King's Collector* 923, 2039, 2667, 6851, 10298. SELANGOR: Ridley 7596.—DISTRIB. Burma (*Wallich* 1779), Java (*Teysmann* 14), Timor (*Forbes* 3892), &c.

We have identified *Teysmann's* Java specimens as belonging to *P. pyramidata*, but we are not sure if *Koorders & Valeton* (Bijdr. VII. 179) considered them to belong to their *P. tomentosa*, which, judging by *Koorders' own* specimens 9714  $\beta$  in the Calcutta Herbarium, is not *P. pyramidata*. We have, therefore, not quoted *Koorders & Valeton*. We agree with Sir D. Brandis ('Indian Trees,' 511) in thinking that *P. bengalensis*, Clarke, is probably only a narrow-leaved form of *P. pyramidata*.



A specimen bearing Father Scortechini's ticket, but without number and without any note of locality, appears to be *Premna acuminata*, R. Br. Prod. Nov.-Holl. 512; Benth. & Muell. Fl. Aust. V. 60, a North Australian species with long-petioled, cordate-ovate, deltoid, poplar-like leaves, and very loose panicles. It may very likely have been collected in a Botanic Garden.

A specimen collected by R. Derry at Bukit Borwang, Malacca, is too incomplete for identification. It may belong to *P. leucostoma*, Miq. Fl. Ind. Bat. II. 899.

# 8. GMELINA, Linn.

Trees or shrubs, unarmed or armed with axillary divaricate spines (abortive branchlets). *Leaves* opposite, entire or more or less lobed. *Flowers* large, yellow or brownish-yellow, often tomentose, in dense or lax sessile or pedunculate cymes along the branches of a terminal panicle; bracts usually small, sometimes large, leafy and coloured. *Calyx* campanulate, 4- to 5-toothed or subentire, persistent and unaltered in fruit. *Corolla* obliquely campanulate or funnel-shaped; tube slender below, much dilated above; limb spreading, oblique, 4- to 5-lobed. *Stamens* 4 didynamous, inserted below the throat of the corolla, included; anthers pendulous, with oblong sub-separate cells. *Ovary* 4-celled, the cells 1-ovuled; style slender; stigma shortly 2-fid; ovules laterally attached to the septum at their middle or higher. *Fruit* a succulent drupe; endocarp bony, 2- to 4-celled, usually with a conical hollow in the middle open on one side. *Seeds* oblong; testa thin, with a corky layer outside; albumen none; cotyledons fleshy; radicle inferior. —DISTRIB. Species about 11, in India, Malaya, China and Australia.

Leaves glaucescent beneath with minute glands, usually 3- or more

lobed .. .. . 1. *G. asiatica*.

Leaves fulvous-tomentose beneath, rarely lobed .. .. . 2. *G. villosa*.

*G. HYSTRIX*, Schultes ex Kurz in Journ. As. Soc. XXXIX. ii. 81 (1870), and For. Fl. II. 265, is a large spinous scandent shrub with very large coloured bracts, a native of Siam and the Philippines, also, according to Kurz, Tenasserim. It is probably only a garden escape in Singapore (Garden road, Ridley 3944).

1. *GMELINA ASIATICA*, Linn. Sp. Pl. 626 (1753). A much-branched spinous straggling shrub; bark yellowish-white; branchlets horizontal, rigid, puberulous, the smaller ones often becoming spines at their ends. *Leaves* membranous; ovate or elliptic or obovate, often 3- or more lobed, the midlobe the longest; upper surface glabrous, lower surface glaucescent from a coating of minute round glands, and villous on the nerves; margins entire except for the 3 or sometimes more lobes which point upwards; .75 to 1.5 in. long, .5 to 1 in. broad; midrib slender; main nerves 2 to 3 pairs; reticulations few; petiole very

slender, up to .5 in. long. *Racemes* fulvous-tomentose, terminal, 1 to 2 in. long; cymules very short; bracts small, caducous; pedicels very short flowers bright yellow. *Calyx* .15 to .2 in. long; tube with large flattened glands, otherwise pubescent; teeth 4, very small, triangular, acute. *Corolla* 2-lipped, obliquely funnel-shaped, puberulous without, nearly 2 in. in length; tube slender below, gradually inflated above; lobes 4, ovate, more or less rounded, the lowest the longest. *Stamens* curved, slightly exsert; filaments thickened, pubescent; anther-cells opening in a horseshoe, connective flattened, all 4 similar. *Ovary* depressed, glabrous; style slender, exsert; stigma 2-lobed. *Drupe* obovoid, yellow when ripe, .75 in. long; pyrene pyriform with a basal cavity, bony. *Seeds* usually 1 or 2 only, oblong at base; testa membranous with a corky covering; albumen fleshy. Roxb. Fl. Ind. III. 87; Lamk. Ill. t. 542; Wall. Cat. 1818 (*in part*); Schauer in DC. Prodr. XI. 679; Wight Ill. t. 174; Bedd. Fl. Sylv. CXXXII; Brandis For. Fl. 365; Blume Bijdr. 814; Miq. Fl. Ind. Bat. II. 866; Clarke in Hook. f. Fl. Br. Ind. IV. 582; Trimen Fl. Ceyl. III. 355; Cooke Bomb. Fl. II. 425; Prain Beng. Plants 829. *G. coromandeliana*, Burm. Fl. Ind. 132. *G. lobata*, Gaertn. Fruct. I. 268, t. 56, *excl. syn.* Rumph. *G. parvifolia*, Roxb. Cor. Pl. II. 32, t. 162; Wall. Cat. 2654; Schauer, *l. c.* *G. parviflora*, Roxb. Fl. Ind. III. 87. *G. inermis*, Blanco Fl. Filip. 493. *Michelia spinosa*, Amman. in Act. Petrop. VIII. 218, t. 18.

PERAK: *Scortechini*. SINGAPORE: *T. Anderson* 135; *Kurz*; *Kunstler* 102.—DISTRIB. India (Deccan Peninsula), Ceylon, Java, Borneo, &c.

2. *GMELINA VILLOSA*, Roxb. Hort. Beng. 46 (1814), and Fl. Ind. III. 86 (1832). A large straggling shrub or small tree with olive-coloured bark; branches spreading and drooping; branchlets round, villous; spines straight, axillary, .25 to .5 in. long. *Leaves* membranous when dry; ovate trapeziform, acute at apex, cuneate at base; upper surface pubescent when young, glabrous and dark-coloured when old; lower surface fulvous-tomentose; margins entire or sometimes obscurely lobed; 1 to 4 in. long, 1 to 2.5 in. broad; midrib slender, raised beneath; main nerves pubescent above, 3 to 4 pairs, the lowest pair from just above the base; transverse nervules slender, nearly horizontal; petiole slender, .75 to 1.5 in. long, channelled above. *Racemes* fulvous-tomentose, 1 to 2 in. long; cymules very short; bracts ovate-lanceolate, cuspidate, about .5 in. long, more or less leafy, deciduous when the flowers open; pedicels very short; flowers yellow. *Calyx* .15 in. long; tube with 3 or more large glands on the under side; teeth 4, small, triangular, acute. *Corolla*-tube slender below for nearly .5 in., then obliquely expanded for nearly 1 in., including the 4 lobes, the lowest of which is longest. *Anthers*, especially of longer pair of stamens, with the connec-

tive enlarged behind. *Style* slender, as long as the longer pair of stamens; stigma 2-lobed, lobes unequal. *Drupe* globose, yellow when ripe, fleshy, .75 in. in diam.; pyrene pyriform, .5 in. long, with a cavity opening on one side at the base; endocarp very hard, thick. *Seeds* usually 1 to 2 only fertile, compressed, acute at the ends; cotyledons fleshy, obcordate, .25 in. long; radicle very small. Jack in Mal. Misc. I. 17, and in Hook. Bot. Misc. I. 284; Wall. Cat. 1816; Schauer in DC. Prodr. XI. 679; Miq. Fl. Ind. Bat. II. 867; Clarke in Hook. f. Fl. Br. Ind. IV. 582; Koord. & Val. Bijdr. VII. 198. *G. asiatica*, Wall. Cat. 1818 (*in part*); Kurz For. Fl. II. 265 (*not of Linn.*). *Gmelina*, sp. n. 2, Griff. Notul. IV. 179. "*Radix deipara*," Rumph. Herb. Amb. II. 124, t. 39.

KEDAH: Langkawi Island, *Curtis*. PENANG: *Wallich* 1816; *Phillips*; *G. King*; *Curtis* 454. PERAK: *Wray* 734; *Scortechini* 740. MALACCA: *Griffith* 6057; *Maingay* (K.D.) 1189. SINGAPORE: *G. Thomson*; *Kurz*; *T. Anderson*; *Deschamps*; *Kunstler* 103.—DISTRIB. Burma (*Kurz*), Nicobars (*Kurz*), Siam, Java, Sumatra (*Forbes* 1576, 2642).

#### 9. CLERODENDRON, Linn.

Trees or shrubs, sometimes straggling or climbing. *Leaves* opposite or rarely verticillate, simple; entire or dentate or angularly-lobed. *Flowers* small or large, of various colours, in axillary cymes or terminal panicles, often leafy below; bracts conspicuous or small; bracteoles 0 or very small. *Calyx* campanulate, rarely tubular, truncate, 5-toothed or almost 5-partite, persistent, often accrescent, often coloured in fruit. *Corolla* hypocrateriform or infundibular; tube usually long, slender; limb usually oblique, more or less 2-lipped, 5-lobed, the lobes spreading. *Stamens* 4 didynamous, long-exserted; filaments filiform, involute in the bud; anthers ovate or oblong, more or less uniform; cells parallel, adherent above, separate below; filaments attached at the notch. *Ovary* imperfectly 4-celled, the cells 1-ovuled; style filiform; stigma shortly bifid. *Fruit* a globose, succulent or rarely dry drupe, 4-grooved or 4-lobed, separating into 4 pyrenes, of which 1 to 3 are sometimes suppressed; exocarp usually fleshy; endocarp bony or crustaceous. *Seeds* oblong or pyriform; albumen 0; cotyledons thick, fleshy; radicle very small, inferior.—DISTRIB. 100 to 120 species, in the warm regions of both hemispheres, but chiefly in the eastern.

Corolla hypocrateriform, the tube rarely more than 1 in. in length (Subgenus 1. EUCLERODENDRON):—

Cymes axillary:—

Cymes few-flowered from most axils; leaves small; calyx-teeth very short .. .. .

1. *C. neriifolium*.

- Cymes in deflexed, pedunculate, close panicles, from upper axils; leaves large; calyx-lobes linear-lanceolate, over .2 in. long .. .. 2. *C. deflexum*.
- Cymes in leafy panicles, the lower branches appearing axillary:—
- Leaves and inflorescence glabrous or only slightly puberulous; leaves usually over 1 in. broad, long-acuminate, membranous .. .. 3. *C. disparifolium*.
- Leaves and inflorescence scabrous-hispid, more or less pubescent; leaves under 1 in. broad, acute, chartaceous .. .. 4. *C. lankawiense*.
- Cymes in terminal panicles:—
- Leaves oblong or lanceolate:—
- Panicles more or less pendulous, long-pedunculate:—
- Leaves 1 to 3 in. broad; calyx-lobes lanceolate, acute .. .. 5. *C. penduliflorum*.
- Leaves 2 to 6 in. broad; calyx-lobes ovate, cuspidate .. .. 6. *C. umbratile*.
- Panicles erect, short-pedunculate or sessile:—
- Leaves entire; calyx cleft nearly to the base; stems fistular:—
- Leaves glabrous; main nerves distant; calyx-lobes acuminate with incurved tips .. .. 7. *C. myrmecophilum*.
- Leaves puberulous; main nerves rather close; calyx-lobes acute, glandular .. .. 8. *C. Curtisii*.
- Leaves serrate, rarely entire; calyx truncate; teeth minute .. .. 9. *C. serratum*
- Leaves ovate, usually cordate at base:— var. *Wallichii*.
- Panicles pyramidal, thyrsoïd; leaves hairy:—
- Corolla-tube over .5 in. long; leaf-margins dentate .. .. 10. *C. infortunatum*.
- Corolla-tube under .3 in. long; leaf-margins entire .. .. 11. *C. villosum*.
- Panicles corymbose; leaves glabrous; corolla-tube over .75 in. long .. .. 12. *C. Colebrookianum*.
- Leaves usually 3 to 7-lobed, under surface prominently glandular .. .. 13. *C. paniculatum*.
- Corolla infundibuliform, the tube more than 1 in. in length (Subgenus 2. SIPHONANTHUS):—
- Leaves usually verticillate, lanceolate; panicle very long, many-flowered; drupe blue .. .. 14. *C. Siphonanthus*.
- Leaves opposite, elliptic or ovate; panicle short, few-flowered; drupe red .. .. 15. *C. Ridleyi*.

The following species are found in cultivation or as escapes from cultivation:—

CLERODENDRON FRAGRANS, R. Br. in Ait. Hort. Kew. ed. 2, IV. 63 (1812). A double-flowered shrub, with large leaves of unpleasant odour, the flowers white merging into dark purple and fragrant.—SINGAPORE: *Deschamps*; *King's Collector* 304.

*C. CALAMITOSUM*, Linn. Mant. 90 (1767). A slender white-flowered shrub, native of Java and often found in gardens. In the Fl. Br. Ind. it has been described as a Malacca species on the authority of Maingay's specimen, but Mr. Ridley informs us that in his opinion the plant is not indigenous and that Maingay's specimen came, in all probability, from a garden escape.

*C. THOMSONÆ*, Balf. f. in. Trans. Bot. Soc. Edinb. VII. 265, t. 7, and 580, t. 16 (1863). A climbing shrub, native of Tropical Africa, with opposite ovate leaves and terminal lax cymes of flowers with a white calyx and crimson corolla.—PENANG: *Curtis* 124. SINGAPORE: *Deschamps*.

*C. SQUAMATUM*, Vahl Symb. II. 74 (1791). An erect shrub, native of India, China, and Sumatra, with ovate cordate leaves and scarlet flowers in large panicles.—SINGAPORE: *Ridley* 9209.

1. *CLERODENDRON NERIIFOLIUM*, Wall. Cat. 1789 (1828). A straggling shrub; branches ashy-grey, lenticellate; branchlets slender, greyish-brown. *Leaves* membranous, ternate or opposite; elliptic, acute or rounded often slightly emarginate at apex, shortly attenuate at base; glabrous, or, when young, sparsely pubescent on both surfaces; margins entire; 1·5 to 3·5 in. long, .75 to 1·75 in. broad; midrib slender; main nerves about 5 pairs, straight or branched to meet in an obscure looped intramarginal nerve; reticulations finely netted; petiole slender, .25 to .5 in. long. *Cymes* axillary, umbellate, sometimes in a 7-flowered dichasium, often only 3-flowered; peduncle 1 to 1·5 in. long; bracts linear, setaceous; bracteoles similar but smaller; pedicels .15 to .25 in. long; flowers white, purplish-pink (*Forbes*). *Calyx* tubular-campanulate, enlarged in fruit and then cup-shaped; tube .15 in. long, pubescent and gland-dotted without; teeth 5, minute. *Corolla*-tube very slender, .75 to 1 in. long; gland-dotted without, villous within; lobes 5, spreading, unequal, somewhat oblong, about .25 in. long. *Stamens* red, long-exserted; anther-cells oblong, parallel. *Ovary* cylindric, obtuse; style very slender; stigma shortly bifid. *Drupe* obovoid, .5 in. long, 4 in. in diameter; top depressed; exocarp spongy; pyrenes 4 readily separating, endocarp crustaceous. *Seed* obovoid; testa thin; cotyledons oblong, thick, fleshy; radicle very short, thick. Schauer in DC. Prodr. XI. 660; Miq. Fl. Ind. Bat. II. 839; Clarke in Hook. f. Fl. Br. Ind. IV. 589; Prain Beng. Plants 835. *C. inerme*, Benth. Fl. Hongk. 271, and Fl. Austral. V. 61; Schauer *l. c.* (*in part*); Wall. Cat. 1788, *Sheet* 1 or *A. C. inerme* var. *neriifolia*, Kurz For. Fl. II. 266. *Volkameria neriifolia*, Roxb. Fl. Ind. III. 64. "*Jasminum litoreum*," Rumph. Herb. Amb. V. t. 46.

KEDAH: in Langkawi Island, *Curtis* (*Hamad*). PENANG: at Batu Ferengy, *Curtis* 2782; (or SINGAPORE), *Wallich* 1788, 1. PERAK: at

Krian, *Scortechini* 1382. MALACCA: *Griffith* (K.D.) 6056, 1; on swampy ground near the sea, *Maingay* (K.D.) 1188. JOHORE: *G. King*. SINGAPORE: *Kunstler* 59; *Hullett* 143; seashore, *Deschamps*.—DISTRIB. India (Chittagong at Mascal Island), Burma (Arracan and Tenasserim coasts), Sumatra (*Forbes* 1802), Borneo (*Haviland* 1018, 3555), Siam, Philippine Islands, China, Australia, Polynesia.

A coast plant, similar to *C. inerme*, Gaertn., of the coasts of India, and considered by some to be a variety of it. It is distinguished by the leaves of different shape and texture, the smaller and more slender and glandular corolla, and the larger drupe. The leaves are sometimes lanceolate (see Roxb. Ic. No. 2524).

2. CLERODENDRON DEFLEXUM, Wall. Pl. As. Rar. III. 10, t. 215 (1832), and Cat. 1808. A shrub, reaching in height 4 ft. (*Wallich*), 4 to 6 ft. (*Kunstler*); branches obscurely quadrangular, furrowed, pubescent, pale-brown. *Leaves* opposite, membranous when dry; variable in shape, elliptic oblong-obovate or oblanceolate, cuspidate-acuminate at apex, rounded or cuneate at base; upper surface slightly pubescent when young, afterwards glabrous except on the nerves; lower surface softly pubescent, at length glabrate; margins entire or slightly undulate repand; 6 to 16 in. long, 2 to 6 in. broad; midrib strong, prominent beneath, pubescent; main nerves 10 to 16 pairs, prominent beneath, the lowest pair from the base at an acute angle, the rest curving upwards to and along the margin; transverse nervules rather regular and conspicuous in old leaves; reticulations netted; petiole 1 to 2·5 in. long, pubescent, swollen above and below, channelled on the upper side. *Panicles* corymbose, axillary in the ultimate or penultimate axils of the branches, usually deflexed at right angles to the branch; peduncles 1 to 8 in. long, with 1 or 2 pairs of bracts like small leaves along them; bracts of the inflorescence lanceolate; corymbs crowded with single flowers or short trichotomous cymes, very many-flowered; bracteoles many, linear; peduncles, bracts, branches and calyx all red when fresh; buds clavate; flowers white tinged with pink. *Calyx*-tube very short, scarcely ·1 in. long; lobes linear-lanceolate, erect, pubescent, ·2 to ·3 in. long; fruiting calyx enlarged and stellately spreading. *Corolla*-tube very slender, ·5 to ·75 in. long, glabrous; lobes subequal, spreading, spatulate, up to ·25 in. long. *Stamens* long-exsert, filaments very slender, glabrous, anthers oblong; cells parallel. *Ovary* rounded, obtuse; style very slender; stigmatic branches short. *Drupe* purple, globose, depressed, smooth, with 4 or fewer pyrenes; pyrenes pyriform, ·35 in. long, ·25 in. broad; endocarp crustaceous, reticulate; seeds conform to the pyrenes; testa membranous;

cotyledons unequal, fleshy; radicle very small. Schauer in DC. Prodr. XI. 665; Miq. Fl. Ind. Bat. II. 875; Clarke in Hook. f. Fl. Br. Ind. IV. 593.

PENANG: Porter (Wallich 1808A); Curtis 81. PERAK: at Gunong Ijuk, &c., *Scortechini* 433, 1230; at Tapa, Waterfall, Maxwell's Hill, &c., Wray 1359, 1414, 2661, 3231, 4203; at Goping, Bukit Bingarang, &c., King's Collector (Kunstler) 168, 307, 1875, 6818. MALACCA: *Cuning* 2368; Griffith; Maingay (K.D.) 1185; Hullett 404; at St. John's Hill, Hervey; at Ayer Punas, Derry 296. JOHORE: G. King. SINGAPORE: Wallich (cf. Pl. As. Rar.); Walker 257, 288; G. King.

3. CLERODENDRON DISPARIFOLIUM, Blume Bijdr. 809 (1826). A shrub or small tree, reaching sometimes 20 ft. or more in height; branches pale brown, lenticellate, obscurely quadrangular; branchlets similar, slender, puberulous. Leaves membranous, the pairs more usually equal but occasionally unequal in size; oblong- or elliptic-lanceolate, long-acuminate at apex, acuminate or acute occasionally almost rounded at base; glabrous and pale on both surfaces except sometimes on the midrib beneath; margins entire or undulate, or obscurely toothed; variable in size as in shape, 2 to 7 in. long, .75 to 2.5 in. broad; midrib slender; main nerves 5 to 7 pairs, the lowest from close above the base and at about 20° to 30° with the midrib, the rest distant, starting at 50° to 60° with the midrib and curving upwards to near the margin, the upper ones joining in an intramarginal looped nerve; reticulations distant, transverse, not prominent; petiole slender, variable, .5 to 2.5 in. long, often twisted at base. Cymes puberulous, in lax spreading terminal or axillary brachiate panicles; the branches slender, repeatedly trichotomous; terminal ones sometimes up to 6 in. long, axillary ones about 2 to 3 in. long; peduncles very slender; bracts linear, usually about .25 in. long, those of main branches sometimes leafy, caducous after flowering; pedicels filiform, .25 to .5 in. long; buds clavate; flowers pale yellow. Calyx reddish; tube campanulate, about .1 in. long; lobes as long as tube, triangular, acute, prominently nerved; the calyx enlarged in fruit to about .5 in. long, with dark red reflexed lobes. Corolla-tube slender, .5 to .75 in. long, glabrous without, puberulous within; lobes 5, subequal, spatulate, .2 to .25 in. long. Stamens exsert. Ovary glabrous; style as long as stamens; stigma shortly bifid. Drupe globose, succulent, .25 in. in diameter. Seeds usually 2 fertile, ovoid; testa thin, wrinkled; cotyledons thick, fleshy; radicle minute. Schauer in DC. Prodr. XI. 672; Hassk. Retzia i. 57; Miq. Fl. Ind. Bat. II. 871; Clarke in Hook. f. Fl. Br. Ind. IV. 589; Koord. & Val. Bijdr. VII. 212. *C. acuminatum*, Wall. Cat. 1792; Schauer l.c. 662; Miq. l.c. 869. *C. Jackianum*, Wall. Cat. 1794, and in Hook. Bot. Misc. I. 284

(note to *C. nutans*, Jack); Bot. Mag. t. 3049 (in note); Schauer l.c., 664; Miq. l.c. 872.

KEDAH: at Pulau Songsong, *Curtis*. PENANG: at Penara Bukit, *Curtis* 1539. PERAK: *Wray* 1352, 2841; *Curtis* 2043, 3196, 3333; *King's Collector* 751, 879, 2301, 4130, 4331, 4332, 5197?, 8772; *Scortechini* 297, 314, 922. DINDINGS: Pangkore, *Scortechini* 1011; *Curtis* 1638. SELANGOR: *Curtis* 3778. MALACCA: *Griffith*; *Harvey*; *Cuming* 2378, 2395; *Ridley* 378; *Derry* 414; *Holmberg* 810; *Goodenough* 1773. JOHORE: *Cantley* 19. SINGAPORE: *Wallich* 1792 c; *Lobb*; *Ridley*; *G. King*; *Maingay* (K.D.) 1186; *Deschamps*; *Murton* 93; *Walker* 54; *Kunstler* 1, 119.—DISTRIB. Malay Archipelago.

4. CLERODENDRON LANKAWIENSE, King & Gamble in Kew Bull. 110 (1908). A shrub; branchlets scabrid-puberulous, obtusely quadrangular, channelled. *Leaves* chartaceous, opposite; oblong-lanceolate or oblanceolate, acute at apex, attenuate at base; both surfaces sparsely glabrous-hispid, pubescent on the nerves beneath; margins entire; 3 to 4 in. long, .5 to 1 in. broad; midrib stout; main nerves 8 to 10 pairs, curving acutely upwards to and along the margin; transverse nervules few, irregular; reticulations netted; petiole .25 in. long, scabrid-pubescent. *Panicle* leafy, terminal, pyramidal, thyrsoïd, reaching 10 in. in length and 4 in. in diam., scabrid-pubescent; branches at about 1 in. intervals, pedunculate, ending in rather few-flowered trichotomous cymes; bracts leaf-like, lanceolate; bracteoles small, setaceous; pedicels slender, about .2 in. long; buds clavate up to .75 in. long. *Calyx* campanulate, scabrous-hispid without, glabrous and with large peltate glands within, cleft about two-thirds down, prominently nerved; lobes ovate, acute, .2 to .25 in. long, .1 in. broad at base. *Corolla*-tube slender, pubescent, cylindric, .5 in. long; lobes spreading, obovate, the midlobe of the lower lip longer than the rest. *Stamens* long-exsert; filaments very slender, glabrous; anthers oblong, .075 in. long; cells parallel. *Ovary* rounded, obtuse; style very slender; stigmatic lobes very short. *Fruit* not seen.

KEDAH: at Terutau on Langkawi Island, *Curtis* 3789.

Only one specimen of this species is available. It is near *C. Griffithianum*, Clarke, but differs in the inflorescence, calyx, &c.

5. CLERODENDRON PENDULIFLORUM, Wall. Cat. 1795 (1828). A shrub; branchlets pale-brown, pubescent, quadrangular. *Leaves* membranous, opposite or ternate; ovate or lanceolate or oblong-lanceolate, long-acuminate at apex, acute at base; glabrous on both surfaces, glaucescent on the lower; margins entire or sometimes crenulate; 5 to 8 in. long, 1 to 3 in. broad; midrib slender; main nerves 5 to 7



pairs, distant, at once curving upwards to and along the margin; reticulations distant, obscure; petiole .5 to 2 in. long, slender, channelled. *Panicle* elongate, very lax, usually pendulous, glabrous or puberulous, long-pedunculate, reaching about 15 in. in length and up to 4 in. in greatest diameter; branches distant, opposite, bearing few-flowered umbellate cymules on slender peduncles .5 to 1 in. long; bracts linear, subulate, .15 to .2 in. long; pedicels slender, .1 to .15 in. long; flowers white; the rachis and calyx red. *Calyx* glabrous, deeply lobed; tube .1 in. long; lobes oblong-lanceolate, acute, .3 in. long; somewhat enlarged, reddish and reflexed in fruit. *Corolla*-tube funnel-shaped, curved, slender, .5 in. long, slightly glandular-pubescent; lobes oblong-spathulate, rounded, the 2 lower slightly emarginate, about as long as the tube. *Stamens* exsert; anther-cells incurved so as slightly to overlap. *Ovary* cylindric, truncate; style slender; stigma shortly 2-fid. *Drupe* fleshy, globose, .25 to .35 in. in diam.; pyrenes 4, thin-walled. *Seed* usually one only; testa membranous, rugose; cotyledons thick, fleshy. Schauer in DC. Prodr. XI. 664; Clarke in Hook. f. Fl. Br. Ind. IV. 591; Bot. Mag. t. 3049 (*in note*).

PENANG: at Penara Bukit and base of Penang Hill, *Ridley* 6947, 7181; *Curtis*; *Deschamps*. PERAK: at Batu Kuran, *Scortechini* 1612. SELANGOR: Caves, Gua Batu, *Ridley* 8212.—DISTRIB. Burma (Arracan (*Kurz*), Tenasserim (*Helfer* (K.D.) 6047), Tavoy (*Wallich* 1795)), Nicobar Islands.

6. CLERODENDRON UMBRATILE, King & Gamble in Kew Bull. 110 (1908). A shrub or small tree, reaching 8 to 15 ft. in height; branchlets pale-brown, smooth, fistular. *Leaves* membranous; variable in shape, usually oblong or obovate or oblanceolate, the broadest part about two-thirds up or even higher, long and rather suddenly acuminate at apex, usually rounded but sometimes attenuate at base; glabrous on both surfaces; entire; 8 to 16 in. long, 2 to 6 in. broad; midrib rather slender; main nerves 8 to 12 pairs, slender, the lowest pair usually from the base at an acute angle with the midrib, the rest at a wider angle curving upwards, the upper ones joining in a looped intramarginal nerve; transverse nervules irregular; reticulations netted; petiole 1 to 3 in. long, flaccid. *Panicles* from the uppermost axils, elongate, lax, somewhat curving, glabrous, usually 4 to 6 in. long and about 3 in. broad, on slender peduncles 4 to 7 in. long; branches divaricate, usually at right angles, with few-flowered cymules; rachis flattened and slightly winged; bracts leafy, lanceolate, up to 1 in. long; bracteoles many, linear-setaceous; pedicels slender, puberulous, .1 to .5 in. long; buds spathulate, curved, 1 in. long; flowers rather large, white tinged with pink; the calyx white or pale green turning red in fruit. *Calyx* large, glo-

bose or slightly puberulous, deeply divided nearly to the base; lobes ovate-acuminate, cuspidate, about .6 in. long by .25 in. broad, enlarging in fruit to 1.5 in. in diam., and then spreading. *Corolla*-tube slender, cylindric, .4 to .6 in. long; lobes spathulate, rounded at top, as long as tube. *Stamens* exsert; filaments glabrous; anthers .1 in. long; cells parallel. *Ovary* rounded, obtuse; style very slender; stigmas 2, short. *Drupe* black, smooth, fleshy, globose, .5 in. in diam.; pyrenes 4 or less, triangular-convex; endocarp crustaceous. *Seeds* rounded, .25 in. in diam.; testa membranous; cotyledons fleshy; radicle minute.

PERAK: at Kapayong Kinta, Wray 167; in dense jungle up to 3500 ft., King's Collector 722, 6959, 8268; *Scortechini* 2198; on Larut Hills, 3000 ft., and in Thaiping Hills, Derry 3704 (Curtis), 10712; at Kwala Dipang, Curtis 3116; at Bujong Malacca, Ridley 9700.—DISTRIB. Sumatra (in deep shade of forest at Grenoeng Trang and Kotta Djawa, Lampongs, Forbes 1333, 1585).

Ridley's No. 7594, from Ginting Bidai, Selangor, appears to be this species, but the leaves are rather narrower than usual and reach 12 in. long by 2.5 in. broad. The specimen is in fruit, which Ridley describes as black with a red calyx.

7. CLERODENDRON MYRMECOPHILUM, Ridley in Journ. Bot. XXXIII. 42 (1895). A sparingly branched shrub, about 3 ft. high; stem stout, terete, glabrous, fistular, the bark white; internodes swollen, hollow. *Leaves* opposite or alternate, membranous when dry; oblong, elliptic-oblong or -oblanceolate, acute or obtuse at apex, acute obtuse or cordate at base; both surfaces glabrous, dull; margins entire; 6 to 12 in. long, 2 to 4 in. broad; midrib stout, broad, pale on the upper surface; main nerves 10 to 13 pairs, curving very gently upwards to meet in a looped intramarginal nerve; transverse nervules very few, irregular; reticulations not visible; petiole 7.5 to 2.5 in. long, fistular. *Panicle* a terminal, shortly peduncled, pubescent, pyramidal thyrsus reaching 10 in. long and 3 to 4 in. broad; branches usually opposite, spreading, of rather few-flowered loose reddish-brown cymes; bracts and bracteoles linear-subulate, caducous reddish-brown; pedicels .15 to .2 in. long; buds clavate, curved; flowers ochreous-red. *Calyx* puberulous, about .3 in. long, cleft nearly to the base; lobes erect, lanceolate acuminate with incurved tips; fruiting calyx enlarged to about 1 in. in diam; lobes triangular-acuminate, reflexed, red. *Corolla*-tube cylindric, about .5 in. long, puberulous without; lobes as long as tube, obovate-oblong; the tips rounded. *Stamens* long exsert; filaments very slender, red; anthers oblong-reniform, .05 in. long; cells parallel. *Ovary* glabrous, obtuse; style as long as stamens, red; stigmatic branches slender. *Drupe*

globose, black, .5 in. in diam., with 4 to 1 pyrenes; pyrenes convex on back, nearly plane on the face, 3-ribbed, .3 to .4 in. long. *Seed* conform with the pyrenes; testa membranous; cotyledons thick, fleshy, unequal; radicle minute. Bot. Mag. t. 7887; Gard. Chron. XXXIII. Ser. 3, 196 (1903), and XXXV. Ser. 3, 237, t. 98 (1904).

JOHORE: at Jaffaria, *G. King*. SINGAPORE: in dense wet woods at Choa-Chu-kang, *Ridley*.

The hollow stems are swollen at the internodes, and there form nests for ants belonging to the genus *Pheidole*, Fabricius. The same phenomenon occurs in *C. fistulosum*, Becc., of Borneo, in *C. formicarum*, Gürke, a native of Tropical Africa (Hook. f. in Bot. Mag. l. c.), and in the next species here described.

8. CLERODENDRON CURTISII, H. H. W. Pearson in Kew Bull. 142 (1901). A small shrub, usually 2 to 3 ft., sometimes reaching 6 ft. high; stem thick, fistular, striate, minutely puberulous. *Leaves* opposite, membranous; elliptic, elliptic-oblong or -obovate, acuminate at apex, broadly cuneate rounded or sometimes slightly cordate at base; both surfaces somewhat puberulous, upper glabrescent when old; margins entire or undulate-denticulate; 4 to 12 in. long, 3 to 6 in. broad; midrib stout, pubescent; main nerves 9 to 12 pairs, curving upwards to and along the margin where they anastomose; transverse nervules fairly regular and prominent; reticulations inconspicuous; petiole thick, striate, puberulous, 1 to 4.5 in. long. *Panicles* terminal, thyrsoid, pubescent, much-branched, reaching 6 to 8 in. long and 4 to 5 in. broad; the rachis and branches angular; branches opposite, with peduncles .75 to 1 in. long and corymbose cymes of many flowers; bracts leafy, the lower large, the upper obovoid or spatulate; bracteoles small, subulate; pedicels slender, .15 in. long; buds clavate, .5 to .75 in. long; flowers bright yellow, tinged with red; the calyx crimson. *Calyx* cleft three-quarters down; lobes lanceolate, acute, 3-nerved, pubescent, ciliate, .25 in. long, .1 in. broad, with usually several rather obscure peltate glands. *Corolla*-tube cylindric, slender, .5 to .7 in. long, puberulous, glandular; lobes obovate or elliptic, narrow at the base, .2 to .3 in. long. *Stamens* long-exsert; filaments glabrous; anthers reniform, under .05 in. long; cells parallel. *Ovary* glabrous, obtuse; style very slender; stigmatic branches short. *Drupe* not seen.

PERAK: at Kota, *Wray* 3246; Lamjibus, *Scortechini* 1555; on Larút Hills, 3000 ft., *Derry* (*Curtis*) 3704; in low swampy places at Larút, *King's Collector* (*Kunstler*) 1966, 2507. DINDINGS: Bruas, in damp places, *Curtis* 3441. SELANGOR: Klang, *Ridley* 10198.

Mr. *Ridley* informs us that this is the same plant as *Clerodendron breviflorum*, *Ridley* in Journ. Bot. XXXII. 43 (1895), which was described from specimens

collected at Kampong Chin-Chin, Ula Batu Pahat, Johore, by Lake & Kelsall in 1892. Unfortunately, there are no specimens in the herbaria at Kew or Calcutta, so we hesitate to alter the name. If the identification proves correct, it is Ridley's name that must take precedence. This is one of the species whose fistular stems contain ants' nests. *C. macrophyllum*, Hook. MS. in Herb. Kew, a large-leaved, handsome species from Java and Borneo, is very closely allied to this species.

9. CLERODENDRON SERRATUM, Spreng. Syst. Veg. II. 758 (1825); Don Prodr. Fl. Nep. 103; Wall. Cat. 1809; Ham. in Trans. Linn. Soc. XVII. 187; Schauer in DC. Prodr. XI. 664; Dalz. & Gibs. Bomb. Fl. 200; Wight Ic. t. 1472; Brandis For. Fl. 364; Kurz For. Fl. II. 267; Blume Bijdr. 810; Miq. Fl. Ind. Bat. II. 873; Clarke in Hook. f. Fl. Br. Ind. IV. 592; Trimen Fl. Ceyl. III. 360; Cooke Fl. Bomb. II. 432; Prain Beng. Plants 835. *C. ternifolium*, Don l.c. *C. macrophyllum*, Sims Bot. Mag. t. 2536; Reich. Fl. Exot. t. 209; Schauer l.c. 674. *C. ornatum*, Wall. Cat. 1811; Schauer l.c. 675. *C. herbaceum*, Wall. Cat. 1815; Schauer l.c. 675. *Volkameria serrata*, Linn. Mant. 90; Roxb. Fl. Ind. III. 62. *V. herbacea*, Roxb. Hort. Beng. 46.—DISTRIB. India, Burma, and Ceylon.

VAR. *Wallichii*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 592. A shrub, reaching 8 to 10 ft. in height (*Kunstler*); branches somewhat herbaceous, smooth, fistular; branchlets smooth, angled and with raised lines decurrent from the nodes. *Leaves* opposite, almost membranous when dry; obovate-lanceolate or oblanceolate, shortly acuminate at apex, acuminate narrowed at base; both surfaces glabrous; margins distantly serrate or denticulate, sometimes entire; 4 to 8 in. long, 1.5 to 3 in. broad; midrib strong, prominent beneath; main nerves 6 to 10 pairs, at first straight, then curving upwards to and along the margin; reticulations irregular; petiole up to about .6 in. long or none when bordered by the decurrent margins of the blade. *Panicle* terminal, erect, elongate, minutely pubescent, reaching 10 to 12 in. in length and 2 to 2.5 in. in breadth; the branches many, divaricate, subdichotomous, many-flowered; bracts foliaceous, large, ovate or obovate, acuminate or obtuse and apiculate; bracteoles many, lanceolate or finally linear; pedicels slender, about .1 in. long; buds spathulate, curved; flowers greyish-white to blue, the lower lobe darker than the rest. *Calyx* campanulate; lobes extremely short, rounded, minutely apiculate; the fruiting calyx cup-shaped, almost truncate, not enlarged. *Corolla*-tube cylindric, slightly narrowed below the oblique throat, .2 to .25 in. long, glabrous without, villous within; lips 2, upper of 2 oblong, flat, obtuse lobes, lower of 3 lobes, the side ones similar to the upper, the midlobe spathulate, concave, emarginate, all about .25 in. long. *Stamens* very long-exsert, much curved; filaments villous at the base and

thickened; anthers oblong, .075 in. long; cells parallel. *Ovary* glabrous, truncate at top; style very long, slender; stigmas 2, rather long. *Drupe* purple, succulent, when dry .25 in. long, and as much broad at top, with 4 (or less) well-marked pyrenes; pyrenes obovoid, plane or concave on inner faces; endocarp crustaceous. *Seeds* obovoid, .15 to .2 in. long, concave on the inner, convex on the outer face, which is wrinkled; testa thin; cotyledons fleshy, unequal, one convex, the other concave; radicle minute. *C. farinosum*, Wall. Cat. 1810 (not *Volkameria farinosa*, Roxb.). *C. divaricatum*, Jack in Mal. Misc. I. 2, and in Hook. Bot. Misc. II. 89; Schauer in DC. Prodr. XI. 674.

PERAK: Wray 1871; at Ipoh, Curtis 3198, 3328; at Ipoh and Baton Gaja, Deschamps; near Thaiping, Scortechini 507; at Goping, King's Collector (Kunstler) 480. SELANGOR: Goodenough 10478; Cecil C. Smith.—DISTRIB. India (Sikkim, Assam and Burma), Sumatra, Java, Celebes, Cambodia.

We have not followed Clarke in quoting *C. javanicum*, Walp. Rep. IV. 113, as we consider the description therein given does not sufficiently fit our specimens.

10. CLERODENDRON INFORTUNATUM, Linn. Sp. Pl. 637 (1753). A shrub, usually about 3 to 8 ft. high, occasionally a small tree, gregarious; branchlets obtusely quadrangular, slightly furrowed, clothed with yellowish pubescence. *Leaves* somewhat coriaceous; ovate, acuminate at apex, rounded or cordate at base; both surfaces roughly strigosely hairy, lower sometimes with small obscure round glands; margins dentate or denticulate, rarely entire; 4 to 10 in. long, 3.5 to 8 in. broad; midrib prominent; main nerves also prominent, about 8 pairs, the lowest two pairs near the base spreading, the rest gradually curving upwards, all joined by prominent transverse nervules which branch and anastomose; reticulations netted; petiole 1 to 4 in. long, densely pubescent. *Panicle* terminal, pyramidal, spreading, 6 to 12 in. long and broad, densely tawny-pubescent; the branches trichotomous, ending in many-flowered cymules; bracts leafy, ovate-lanceolate, deciduous; bracteoles lanceolate, also deciduous; pedicels slender, .25 to .5 in. long; buds clavate, rounded at top; flowers white, tinged with pink; the calyx red at the base (Ic. Roxb.). *Calyx* cleft nearly to the base, silky pubescent, often with scattered, large, round, peltate glands; the lobes lanceolate, acute, suberect, .3 to .4 in. long; fruiting calyx enlarged, crimson, reaching 1.5 in. in diam. when spread out. *Corolla* densely pubescent without; tube cylindric, slender, .5 to .75 in. long; lobes spreading, as long as the tube, the 2 upper somewhat spathulate, the 3 lower ovate, oblong, rounded. *Stamens* long-exsert; filaments glabrous; anthers oblong; the cells parallel. *Ovary* rounded, glabrous;

style slender; stigmas 2, short. *Drupe* nearly globose, shining, black, 3 in. in diam., with 4 to 1 pyrenes; pyrenes convex without; the endocarp crustaceous. *Seeds* conform to the drupe; testa membranous; cotyledons fleshy. Gaertn. Fruct. I. 271, t. 57, fig. 1; Lamk. Ill. t. 544; Wall. Cat. 1796; Schauer in DC. Prodr. XI. 667; Dalz. & Gibs. Bomb. Fl. 200; Wight Ic. t. 1471 (?); Bedd. Fl. Sylv. CLXXXIII., and Anal. XXII. fig. 1; Brandis For. Fl. 363; Kurz For. Fl. II. 267; Miq. Fl. Ind. Bat. II. 876; Trimen Fl. Ceyl. III. 361; Clarke in Hook. f. Fl. Br. Ind. IV. 594; Cooke Fl. Bomb. II. 432; Prain Beng. Plants 835. *C. viscosum*, Vent. Jard. Malm. t. 25; Bot. Mag. t. 1805; Bot. Reg. t. 629. *C. cordatum*, Don Prodr. Fl. Nep. 103; Schauer l. c. 674. *Volkameria infortunata*, Roxb. Fl. Ind. III. 59. *Clerodendron*, Linn. Fl. Zeyl. 232; Burm. Thes. Zeyl. 66.

SIAMESE STATES: Poongah, Curtis 2949. SINGAPORE: Schomburgk 106.—DISTRIB. India, Burma, Ceylon, Java, Moluccas.

We have not quoted "*Peragu*," Rheede Hort. Mal. II. t. 25, which Clarke & Miquel consider to be this species. Schauer quotes it under *C. villosum*, and it seems to us to resemble that species more closely in the leaves and calyx. *C. villosum* has not hitherto been recorded from the Western Peninsula, but Gamble has specimens collected in the Wynaad region of the Nilgiris which seem to be it and not *C. infortunatum*. We do not feel very sure that the plant figured in Wight Ic. t. 1471 is not *C. villosum* rather than *C. infortunatum*.

11. CLERODENDRON VILLOSUM, Blume Bijdr. 811 (1826). A shrub, usually about 3 to 5 ft. high (10 to 15 ft., *King's Collector*; 15 to 20 ft., *Kurz*); branchlets stout, obtusely quadrangular, densely tawny-villous, channelled on the sides. *Leaves* chartaceo-coriaceous; ovate acuminate at apex, cordate or truncate at base, sometimes slightly cuneate; both surfaces tawny-villous or velvety tomentose, those of young leaves white-silky; margins entire; 4 to 8 in. long, 3 to 5 in. broad; midrib stout, prominent; main nerves 5 to 6 pairs, the lowest pair from the base spreading at right angles to the midrib with about 8 to 10 nerves from the lower side, the next pair from close above it curving upwards with also about 8 to 10 nerves from the lower side, the rest more distant and similarly curving; transverse nervules distant, pale; reticulations obscure; petiole 2 to 6 in. long, densely tawny-pubescent. *Panicle* terminal, pyramidal, thyrsoid, spreading, reaching 4 to 7 in. long and 6 in. broad, densely tawny-pubescent; branches long peduncled, ending in trichotomous cymes of rather few flowers; bracts leafy, ovate-lanceolate, acuminate, persistent; bracteoles many, small, lanceolate, deciduous; pedicels .1 to .2 in. long; buds short, clavate, rounded; flowers white or cream-coloured, tinged with red. *Calyx* cleft about

two-thirds down, with large prominent, scattered, rounded glands; lobes ovate-lanceolate, cuspidate-acuminate, .25 in. long; fruiting calyx white, much enlarged, nearly 1 in. in diam. when opened, completely embracing the fruit. *Corolla* villous; tube cylindric, .2 to .3 in. long; lobes obovate-oblong, as long as tube. *Stamens* long-exsert; filaments slender; anthers oblong-reniform; cells parallel. *Ovary* glabrous, obtuse; style slender, longer than the stamens; stigmatic lobes 2 very short. *Drupe* globose, shining, black when ripe (*King's Collector*), white (*Jack*), slightly succulent, with 4 to 1 pyrenes; pyrenes convex on the outer, flattened on the two inner, faces, .25 in. long; endocarp crustaceous, reticulate. *Seeds* oblong, curved, .15 to .2 in. long; testa thin; cotyledons fleshy, curved, somewhat unequal; radicle minute. Schauer in DC. Prodr. XI. 667; Kurz For. Fl. II. 268; Miq. Fl. Ind. Bat. II. 877; Clarke in Hook. f. Fl. Br. Ind. IV. 595. *C. molle*, Jack in Mal. Misc. I. 15, and in Hook. Bot. Misc. I. 283 (not of H.B.K.). *C. velutinum*, Wall. Cat. 1797. *C. trichotomum*, Wall. Cat. 6315 B (not of Thunb.).

PENANG: *Curtis* 101; roadsides on the hill, *Deschamps*; near top of the hill, *G. King*. PERAK: *Scortechini* 1389; in open forests, at 100 to 300 ft. alt., *King's Collector* (*Kunstler*) 5191, 5647, 8831. DINDINGS: Pangkore, *Scortechini* 63. MALACCA: *Griffith* 6051; *Main-gay* (K.D.) 1187; *Hervey*; *Derry* 148. SINGAPORE: *Cuming* 2415; *Wallich* 1797; *Murton* 124; *Schomburgk* 66; *Kurz*; *G. King*; *Deschamps*.—DISTRIB. Burma (Martaban, fide *Kurz*; Mergui, *Griffith*), Java, Sumatra; Philippines.

12. CLERODENDRON COLEBROOKIANUM, Walp. Rep. IV. 114 (1844). A large shrub, sometimes a small tree with silver-grey bark; branchlets glabrous, or the uppermost pubescent, quadrangular, furrowed below the leaf-petioles, more or less fleshy and soft; innovations tawny-pubescent. *Leaves* membranous when dry, opposite; broadly ovate, acute at apex, cordate at base, the sinus rather broad; both surfaces glabrous except the nerves beneath which are puberulous, a few large glands on the lower surface especially near the apex of the petiole; margins entire or sinuate; 5 to 12 in. long, 4 to 10 in. broad; midrib prominent; main nerves 8 to 10 pairs, the lowest pair from just above the petiole, with about 5 to 6 branch-nerves on the outer side, all spreading and curving only close to the margin; transverse nerves faint, as are the netted reticulations; petiole 2 to 8 in. long, cylindric, smooth. *Panicles* large, spreading, terminal, pubescent, reaching 1 to 2 ft. in diam.; branches long-peduncled, ending in corymbose, close, many-flowered cymes; bracts lanceolate, caducous; bracteoles many, lanceolate; pedicels short, .1 to .2 in. long; buds clavate, often 1 in.

long; flowers white to rose-purple. *Calyx* pubescent, .15 to .25 in. long, cleft half-way down; tube with often a large gland under each lobe; lobes triangular-lanceolate, acute; fruiting calyx scarcely enlarged. *Corolla*-tube cylindric, slender, nearly glabrous, .75 to 1 in. long; lobes elliptic or obovate, .25 in. long. *Stamens* long-exsert; filaments glabrous; anthers oblong-reniform, .075 in. long; cells parallel. *Ovary* glabrous, obtuse; style very long and slender; stigmatic lobes 2, short. *Drupe* glabrous, blue, .3 to .35 in. in diam. with usually 4 pyrenes. Schauer in DC. Prodr. XI. 672; Clarke in Hook. f. Fl. Br. Ind. IV. 594. *C. glandulosum*, Colebr. MS. ex Wall. Cat. 1806; *vide* Walp.; Lindl. in Bot. Reg. t. 19 (1844) *in note*; Schauer *l.c.*

SINGAPORE: *Lobb*.—DISTRIB. India (Sikkim, Assam, Burma). It is not quite certain that it is really indigenous in the Peninsula; *Lobb's* specimen may have been from a cultivated plant.

VAR. *Forbesii*, King & Gamble. Leaves and branchlets puberulous; panicles reduced to a terminal corymb of closely packed flowers 4 to 5 in. long; no glands on calyx or midrib of leaf; flowers dark scarlet.

Sumatra (near Kagoengan Ratoe, Lampongs, at 500 ft. alt., *Forbes* 1786).

13. *CLERODENDRON PANICULATUM*, Linn. Mant. 90 (1771). A shrub, reaching 4 to 6 ft. in height; branchlets quadrangular, channelled below the leaf-petioles, glabrous or puberulous, the bases of the leaves (as also the branches of the inflorescence) joined at the nodes by a belt of soft brown hairs. *Leaves* membranous; variable in shape, usually orbicular or ovate, from almost simple to deeply 3- to 7-lobed, cordate or hastate at base, acuminate at apex and at the apices of the lobes; upper surface sparsely hispid or glabrescent, lower pale and densely covered with round peltate glands; margins entire or minutely denticulate; 4 to 8 in. in diam.; midrib stout, ribs usually 3 pairs radiating from the base, the lower deflexed; main nerves of middle lobe 5 to 6 pairs, of side lobes about the same but stronger on the lower side; reticulations slender, netted; petiole variable, 1 to 6 in. or more. *Panicles* terminal, thyrsoïd, pyramidal, spreading, 4 to 12 in. long by 3 to 8 in. broad, with opposite branches bearing trichotomous cymes with racemose reddish branches, the rhachises channelled; bracts foliaceous, like the leaves but smaller; bracteoles small, linear, numerous, red; pedicels slender, red, .25 to .75 in. long; buds clavate, the head globose; flowers red, orange or almost white; the calyx red. *Calyx* divided nearly to the base; lobes oblong-lanceolate, acute, .15 to .2 in. long, much enlarged in fruit, stellate, the lobes closely embracing the drupe. *Corolla*-tube slender, cylindric, puberulous, .5 to .7 in. long; lobes nearly equal, elliptic, .2 to .4 in. long, patent. *Stamens* long exserted; filaments red, glabrous;



anthers oblong-reniform; cells parallel. *Ovary* glabrous, cylindric; style very slender; stigmatic branches short. *Drupe* obovoid, 1- to 4-pyrened (usually 1 only); pyrenes pyriform; endosperm crustaceous, reticulate. *Seeds* conform to the pyrene; testa membranous; cotyledons unequal, fleshy; radicle very small. Ait. Hort. Kew. ed. 2, IV. 64; Vahl Symb. II. 74; Bot. Reg. t. 406; Reichb. Fl. Exot. t. 208; Hassk. Pl. Jav. Rar. 488; Schauer in DC. Prodr. XI. 668; Blume Bijdr. 811; Miq. Fl. Ind. Bat. II. 879; Clarke in Hook. f. Fl. Br. Ind. IV. 593; Hook. f. Bot. Mag. t. 7141. *C. pyramidale*, Andr. Bot. Rep. t. 628; Wall. Cat. 1802. *C. splendidum*, Wall. Cat. 1803. *Volkameria angulata*, Lour. Fl. Cochinch. 389.

KEDAH: on low ground near sea-level, *King's Collector* (Kunstler) 1792. PENANG: *Wallich* 1802; at Tanjong Bunga, *Curtis* 313. PERAK: *Wray* 42, 2435; at L. W. Resthouse, *Scortechini* 915; at Ipoh, *Deschamps*; at Larut, on rocks at 300 to 800 ft. alt., *King's Collector* 6437. SELANGOR: gap on Pahang side, at 2000 to 3000 ft. alt., *Curtis* 3759. MALACCA: *Griffith* 6050. SINGAPORE: *Ridley*; gardens, hedges, and waste places, *Deschamps*; Bukit Mandai, *Goodenough*.—DISTRIB. Siam (Hemsley in Journ. Linn. Soc. XXVI. 262).

14. CLERODENDRON SIPHONANTHUS, Br. in Ait. Hort. Kew. ed. 2, IV. 65 (1812). An erect, usually single-stemmed, little-branched shrub, reaching 4 to 8 ft. in height; branchlets channelled, smooth-barked. *Leaves* membranous when dry, verticillate, 3- to 5-nate or opposite, the bases of the petioles joined by a pubescent ring; narrowly lanceolate or oblong-lanceolate, shortly acuminate at apex, attenuate at base; both surfaces glabrous, the lower pale; margins entire or sinuate, recurved; 4 to 8 in. long, .5 to 1 in. broad; midrib prominent; main nerves 10 to 12 pairs, very short, straight, joining prominent looped intra-marginal nerves which start from the base; transverse nervules very few; petiole none or extremely short. *Panicle* terminal, thyrsoïd, leafy, reaching 8 to 18 in. in length, and 4 to 6 in. in diam.; branches red, verticillate, of lax peduncled few-flowered cymes; bracts linear-lanceolate, .5 in. long; bracteoles subulate; pedicels .5 to 1.5 in. long, puberulous; buds long, clavate; \*flowers white, changing to cream-colour. *Calyx* puberulous, divided three-fourths down; lobes ovate-lanceolate, acute, densely clothed within with minute round glands, .3 to .4 in. long, .15 in. broad; fruiting calyx greatly enlarged, leathery, up to 1.5 in. in diam., crimson. *Corolla*-tube funnel-shaped, glabrous, curved, 3 to 4.5 in. long, about .1 in. broad below, widening above; lobes spreading, obovate- or oblong-obtuse, .3 to .4 in. long. *Stamens* long exsert; filaments slender, glabrous; anthers oblong, .1 to .15 in. long; cells parallel. *Ovary* glabrous, obtuse; style very long, slender;

stigmatic branches short, rather thick. *Drupe* 1- to 4-lobed according to the number of pyrenes, about .5 in. in diam.; exocarp fleshy, dark blue; pyrenes rounded except a slight flattening on the inner side, smooth, .4 in. by .25 in.; endocarp crustaceous. *Seeds* conform to the pyrenes; testa thin, soft; cotyledons very fleshy; radicle very small. Wall. Cat. 1784; Wight Ill. t. 173; Schauer in DC. Prodr. XI. 670; Brandis For. Fl. 364; Dalz. & Gibs. Bomb. Fl. Suppl. 69; Miq. Fl. Ind. Bat. II. 883; Clarke in Hook. f. Fl. Br. Ind. IV. 595; Cooke Fl. Bomb. II. 433; Prain Beng. Plants 836. *C. verticillatum*, Don Prodr. Fl. Nep. 102; Schauer l.c. 671. *Siphonanthus indica*, Willd. Sp. Pl. I. 606; Lamk. Ill. t. 79, fig. 1; Roxb. Fl. Ind. III. 67. *S. angustifolia*, Willd. l.c. *Ovieda mitis*, Burm. Fl. Ind. 136, t. 43, figs. 1, 2.

PERAK: at Trong, Wray 3170.—DISTRIB. India, Burma, Java, Sumatra, Celebes, Siam (*Schomburgk* 302). Often cultivated in gardens.

15. CLERODENDRON RIDLEYI, King & Gamble in Kew Bull. 111 (1908). A small slender tree, reaching 15 ft. in height and 2 to 3 in. in diam.; branches smooth, pale brown; branchlets (also rachis of inflorescence) quadrangular, shining. *Leaves* opposite, membranous; elliptic, elliptic-lanceolate or ovate, caudate-acuminate at apex, rounded or cuneate at base; both surfaces glabrous, the lower pale; margins entire; 3 to 7 in. long, 1 to 3 in. broad; midrib slender, prominent beneath; main nerves 5 to 7 pairs, the lowest pair from close to the base at an acute angle with the midrib, the rest more spreading, meeting in a looped intramarginal nerve; transverse nervules few, irregular, other reticulations not visible; petiole slender, .75 to 2 in. long, winged by decurrent ridges from the base of the blade. *Panicle* terminal, few-flowered, reaching with the peduncle at most 6 in. long and 3 in. broad; branches divaricate, 1 to 1.5 in. long; bracts leafy, lanceolate, acuminate, caducous; bracteoles linear; pedicels slender, .25 in. long; buds very long, clavate; flowers white (*Ridley*) or pale yellow (*Kunstler*). *Calyx* erect, deeply divided; lobes glabrous, lanceolate, caudate-acuminate, .5 to .7 in. long, often with scattered large peltate glands; fruiting calyx enlarged, enclosing the fruit, 1.5 in. in diam. when opened out, deep red in colour. *Corolla*-tube cylindric, slightly funnel-shaped at top, 3 to 3.5 in. long, very slender; lobes obovate, obtuse, .5 in. long, subequal. *Stamens* long-exsert; anther-cells parallel. *Ovary* glabrous, obtuse, 4-lobed; style very long, slender; stigmatic lobes very short. *Drupe* deep red, smooth, globose, fleshy, .5 in. in diam. with 4 to 1 pyrenes; pyrenes pyriform, slightly ribbed; endocarp crustaceous. *Seeds* conform to the pyrenes; testa membranous; cotyledons very thick, fleshy.

PERAK: in dense forest near Larút, up to 300 ft., *King's Collector* 2944, 3988. SELANGOR: at Batu Tiga, *Ridley* 11862.

CLERODENDRON LOBBII, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 590 (1885), is a climbing shrub which, in all probability, does not belong to this genus. Mr. Ridley informs us that it is very common in Borneo, and that he thinks Lobb's specimen must have been collected at Kuching and not in Penang. It is a very handsome, striking plant, and has been cultivated. It has the upper leaves of the spray bright red, flowers of a light salmon-red, and a horn-shaped fruit about 2 in. long. There is a good picture of it in Miss North's Gallery at Kew, to which Mr. Ridley has drawn our attention.

# 10. VITEX, Linn.

Trees or shrubs. *Leaves* opposite, digitately 3- to 7-foliolate, sometimes 1-foliolate; leaflets usually entire, sometimes dentate, generally petiolulate. *Flowers* blue, white or yellow, in sessile or pedunculate cymes forming terminal or axillary or both terminal and axillary panicles or corymbs; bracts usually small, often caducous. *Calyx* campanulate or tubular funnel-shaped, usually truncate or shortly 5-toothed, sometimes bilabiate with 3 to 5 teeth. *Corolla* small, 2-lipped; tube long or short; upper lip usually of 2, lower of 3, lobes, the central lobe of the lower lip much the longest. *Stamens* 4 didynamous, usually exserted; anther-cells various, always attached at the tip only, generally parallel at first, afterwards divaricate. Ovary 2- to 4-celled, 4-ovuled; style filiform; stigma bifid. *Fruit* a globose or ovoid or obovoid drupe; supported by the more or less enlarged calyx; mesocarp generally fleshy; endocarp a bony pyrene, normally 4-celled and 4-seeded, but often with some of the cells suppressed, the base of the pyrene sometimes hollowed in a cavity. *Seeds* obovate or oblong; albumen 0; cotyledons usually fleshy; radicle inferior.—DISTRIB. About 120 species, in all tropical and warm temperate regions.

Inflorescence terminal, with occasional additional branches in the axils of uppermost leaves:—

Leaves without wings to the petioles:—

Shrubs or small trees; leaves membranous, grey-pubescent beneath:—

- |                                                                                                         |                         |
|---------------------------------------------------------------------------------------------------------|-------------------------|
| Leaves 1- to 3-foliolate; margins entire; petiole under 1 in. long; calyx under .1 in. long .. ..       | 1. <i>V. trifolia</i> . |
| Leaves 3- to 5-foliolate; margins sometimes crenate; petiole over 1 in. long; calyx over .1 in. long .. | 2. <i>V. Negundo</i> .  |

Trees; leaves chartaceous or coriaceous, not grey-pubescent beneath:—

Leaves 1-foliolate, coriaceous:—

- |                                                                                                 |                           |
|-------------------------------------------------------------------------------------------------|---------------------------|
| Leaves 1.5 to 4.5 in. broad, with a prominent intra-marginal nerve; panicle-branches spicate .. | 3. <i>V. holophylla</i> . |
|-------------------------------------------------------------------------------------------------|---------------------------|

- Leaves 2 to 3 in. broad, no prominent intramarginal nerve; panicle-branches racemose .. .. 4. *V. Clarkeana*.
- Leaves 3-foliolate; leaflets petiolulate:—
- Leaves coriaceous; inflorescence of stout panicles up to 8 in. long, the flowers clustered .. .. 5. *V. coriacea*.
- Leaves chartaceous; inflorescence of slender panicles, the flowers not clustered .. .. 6. *V. siamica*.
- Leaves 3- to 5-foliolate, chartaceous or coriaceous:—
- Leaflets sessile or subsessile; inflorescence densely tawny-pubescent; bracts large, conspicuous .. 7. *V. pubescens*.
- Leaflets petiolulate; inflorescence thinly cinereous-tomentose; bracts very small or none:—
- Leaflets long-acuminate; panicle-branches slender, with few-flowered cymules; corolla-tube without a ring of hairs within .. .. 8. *V. heterophylla*.
- Leaflets short-acuminate; panicle-branches stout, with many-flowered cymules; corolla-tube with a ring of hairs within .. .. 9. *V. sumatrana*  
var. *urceolata*.
- Leaves with winged petioles, the wings broad:—
- Leaflets long-lanceolate, scabrous-dotted, under 2·5 in. broad .. .. 10. *V. pteropoda*.
- Leaflets elliptic or elliptic-obovate, over 3 in. broad, not scabrous-dotted .. .. 11. *V. per-alata*.
- Inflorescence axillary:—
- Leaves 3- to 5-foliolate, glabrate; cymes peduncled, reaching 4 to 5 in. long .. .. 12. *V. glabrata*.
- Leaves 3-foliolate; cymes sessile, under 1·5 in. long:—
- Leaves and cymes densely tawny-pubescent; drupe with a hard-ridged pyrene, having 3 to 4 seed-bearing cells above and an empty cavity below:—
- Calyx-lobes oblong-lanceolate, 25 in. long, conspicuous; bracts large, conspicuous; leaves large .. .. 13. *V. longisepala*.
- Calyx-lobes short, acute, inconspicuous; bracts minute, caducous; leaves small .. .. 14. *V. vestita*.
- Leaves glabrate; cymes sparingly fulvous-hairy; calyx 2-lipped .. .. 15. *V. gamosepala*.

We have not maintained Clarke's subgenus *Glossocalyx* because the species *V. gamosepala*, for which it was established, is so very nearly allied to *V. longisepala* and *V. vestita* that, if any subgenus were necessary, it ought to be one which would include these three, so different in inflorescence and fruit from the rest of the genus, and closely allied to *Premna* and *Gmelina*.

1. *VITEX TRIFOLIA*, Linn. Sp. Pl. 638 (1753). A shrub or small tree; bark smooth, pale grey; branchlets quadrangular, covered with an appressed hairy tomentum. *Leaves* membranous; 1- to 3-foliolate; the terminal leaflets sessile or very shortly petiolulate, the lateral leaflets sessile; leaflets elliptic or obovate, or almost orbicular (especi-

ally when 1-foliate), obtuse or acute at apex, rounded or cuneate (especially the terminal, if 3) at base; upper surface glabrous, lower densely white-tomentose; margins entire; end leaflet 1 to 3 in. long, .5 to 1.25 in. broad, lateral leaflets smaller; main nerves 8 to 12 pairs, inconspicuous; petiole slender, .5 to 1 in. long. *Panicles* terminal, oblong, white-tomentose, reaching 1 to 5 in. in length; the rachis sub-quadrangular; cymes opposite, up to 1 in. long, brachiate; bracts linear, minute; flowers lavender to blue. *Calyx* sessile, campanulate, .075 to .1 in. long; tube ribbed from the teeth, white-tomentose; teeth 5, regular, acute, very small. *Corolla* .25 to .35 in. long; tube scaly-pubescent without, villous within at the insertion of the stamens; upper lip of 2 short rounded lobes, lower of 3 lobes, the lateral lobes .06 in. long, the midlobe longest, .125 in. long, villous, hairy within and usually incurved. *Stamens* exsert; filaments hairy-villous near the base; anther-cells curved. *Ovary* rounded, depressed, glandular-dotted. *Drupe* ellipsoid, depressed at top, .2 in. in diam., slightly ribbed, glandular-dotted, half-enclosed in the somewhat enlarged calyx. Linn. f. Suppl. 293; Lamk. Dict. II. 613; Roxb. Fl. Ind. III. 69; Bot. Mag. t. 2187; Wall. Cat. 1743; Schauers in DC. Prodr. XI. 683; Blume Bijdr. 812; Miq. Fl. Ind. Bat. II. 859; Benth. in Fl. Austral. V. 66; Bedd. Fl. Sylv. CLXXII; Brandis For. Fl. 370; Clarke in Hook. f. Fl. Br. Ind. IV. 583; Trimen Fl. Ceyl. III. 356; Cooke Fl. Bomb. II. 428; Prain Beng. Plants 833; Koord. & Val. Bijdr. VII. 200. *V. ovata*, Thunb. Fl. Jap. 257; Lamk. l. c.; Hook. & Arn. Bot. Beech. Voy. 206, t. 47. *V. repens*, Blanco Fl. Filip. 513. *V. incisa*, Wall. Cat. 1746 (partly, not of Lamk.). *V. Agnus castus* var., Kurz For. Fl. II. 269. "*Lagondium vulgare*," Rumph. Herb. Amb. IV. 48, t. 18. "*Caranosi*," Rheede Hort. Mal. II. t. 11.

PERAK: *Scortechini* 644, 1459. MALACCA: *Griffith*; *Maingay* (K.D.) 1206; *Hervey*. SINGAPORE: at Pulau Obun, *Kunstler* 57. —DISTRIB. India, Ceylon, Malay Archipelago, North Australia, Japan.

2. *VITEX NEGUNDO*, Linn. Sp. Pl. 638 (1753). A large shrub or small tree; bark thin, grey; branchlets quadrangular, covered with an appressed hairy tomentum. *Leaves* membranous; 3- to 5-foliate, the terminal leaflet petiolulate (up to .75 in. long), the lateral leaflets shortly petiolulate (usually about .25 in.), sometimes nearly or quite sessile; leaflets lanceolate, acuminate at apex, attenuate at base; upper surface nearly glabrous, lower densely white-tomentose; margins entire or sometimes coarsely crenate; end leaflet 2 to 4 in. long, .5 to 1.25 in. broad, lateral leaflets shorter; main nerves about 15 pairs with a few secondary nerves between; petiole slender, 1 to 1.5 in. long, white-tomen-

tose. *Panicles* 1 to 3 together, terminal, oblong-pyramidal, white-tomentose, reaching 12 in. long; the rachis quadrangular; peduncle of each branch variable, 1 to 4 in. long; cymes opposite, reaching 1 in. in length, but usually shorter, brachiate, at first dichotomous; bracts linear, short, the lowest somewhat leafy; flowers blueish-purple. *Calyx* sessile, campanulate; tube .1 to .15 in. long, faintly ribbed, enlarged in fruit; teeth regular, acute, .05 in. long, sometimes slightly cuspidate. *Corolla* .25 to .35 in. long; tube scaly-pubescent and slightly glandular without, villous within at the insertion of the stamens and on the midlobe of the lower lip; upper lip 2-lobed, lobes rounded, recurved; lower lip 3-lobed, the midlobe much the longest and obtuse at tip, lateral lobes spreading. *Stamens* exsert; filaments villous at the base; anther-cells curved. *Ovary* rounded, very slightly glandular. *Drupe* ovoid, depressed at top, .2 in. in diam., slightly ribbed, glandular-dotted. Roxb. Fl. Ind. III. 70; Wall. Cat. 1744; Schauer in DC. Prodr. XI. 684; Wight Ic. t. 519; Bedd. Fl. Sylv. CLXXI; Brandis For. Fl. 369; Miq. Fl. Ind. Bat. II. 890; Clarke in Hook. f. Fl. Br. Ind. IV. 583; Trimén Fl. Ceyl. III. 357; Cooke Fl. Bomb. II. 428; Prain Beng. Plants 833; Koord. & Val. Bijdr. VII. 201. *V. bicolor*, Willd. Enum. Hort. Berol. 660; Schauer l. c. 683; Dalz. & Gibs. Bomb. Fl. 201. *V. arborea*, Desf. Cat. Hort. Paris, 391. *V. paniculata*, Lamk. Dict. II. 612; Roxb. l. c. 71. "*Lagondium litoreum*," Rumph. Herb. Amb. IV. t. 19. "*Bem-nosi*," Rheede Hort. Mal. II. t. 12.

PETANI: at Tomoh, *Machado* (Ridley 5813). MALACCA: *Griffith*. SINGAPORE: *Ridley* 4118. — **DISTRIB.** India, Ceylon, Malay Archipelago. Ridley thinks it is probably not really indigenous in the Peninsula.

3. *VITEX HOLOPHYLLA*, Baker in Kew Bull. 25 (1896). A small tree; branches with yellowish-white bark; branchlets also yellowish, shining, obtusely quadrangular; innovations tawny-tomentose. *Leaves* opposite, coriaceous, simple; ovate-lanceolate or ovate-oblong, acuminate at apex, rounded at base; both surfaces glabrous, upper olive-green, lower ferruginous; margins entire; 4 to 12 in. long, 1.5 to 4.5 in. broad; midrib stout, prominent, keeled above; main nerves 7 to 9 pairs at an angle of 70° with the midrib, curving upwards to meet in an intramarginal looped nerve, all slightly impressed above, raised beneath; secondary nerves many, irregular; reticulations prominent, netted; petiole .75 to 1.5 in. long, prominently jointed at both ends, younger ones puberulous. *Cymes* in terminal panicles of rather long glomerulate spikes reaching 6 to 7 in. long and 3 to 4 in. broad; densely tawny-tomentose when young, afterwards glabrate; bracts lanceolate or elliptic-lanceolate, caducous, .1 to .2 in. long; bracteoles 2, much smaller; flowers in each

glomerule about 3 on each side, sessile. *Calyx* campanulate, tawny-pubescent and glandular, .1 in. long; lobes 5 subequal, deltoid; calyx in fruit much accrescent, cup-shaped, truncate, .5 in. in diam. *Corolla*-tube funnel-shaped, pubescent and glandular without, sparsely villous within; 2-lipped, upper lip shortly 2-lobed, the lobes rounded, reflexed, lower lip 3-lobed, midlobe long, very villous within. *Stamens* exsert; filaments slightly villous; anther-cells divaricate, often recurved. *Ovary* rounded, villous at tip. *Drupe* globose or obovoid, .75 in. in diam., depressed at apex; pericarp crustaceous; cells 2; seed usually 1.

JOHORE: at Sungee Kaling, *Ridley* 4031.—DISTRIB. Borneo (at Sandakan, *Governor Creagh*; *Lowe*; at Sarawak, *Beccari* 1111).

4. *VITEX CLARKEANA*, King & Gamble. A small shrubby tree, reaching about 15 ft. in height; branchlets pale brown, round, glabrous or puberulous. *Leaves* coriaceous, 1-foliolate; leaflet sessile, lanceolate or oblong-lanceolate, acuminate at apex, rounded at base; both surfaces glabrous, greyish when dry, the lower punctulate; margins entire, recurved; 6 to 12 in. long, 2 to 3 in. broad; midrib stout, very prominently raised on the lower, slightly on the upper surface; main nerves 12 to 20 pairs, irregularly but slightly curving to near the margin, where they sharply bend parallel to it, all but the few lowest joining in an intramarginal looped nerve; secondary nerves few between the main nerves; reticulations irregular, not transverse and not prominent; petiole .5 to .75 in. long, jointed at the base of the leaflet. *Panicle* terminal, puberulous, 12 to 18 in. long; peduncle stout, angled, 2 to 4 in. long; main branches usually 3, elongate, the middle one usually longest, bearing distant opposite corymbose cymes of rather large flowers; the cymes 1 in. rarely 2 in. long; bracts small, caducous; bracteoles minute; pedicels about .1 to .2 in. long, much thickened in fruit; flowers pale blue, the lip darker. *Calyx*-tube campanulate, tawny-pubescent, .125 to .15 in. long, much enlarged in fruit; lobes 5 irregular, short, acute. *Corolla*-tube .25 in. long, pubescent without and at the insertion of the stamens within, 2-lipped; upper lip shortly 2-lobed, lobes recurved; lower lip 3-lobed, the midlobe twice as long as the recurved sides-lobes, constricted below, spreading above, crenate, villous. *Stamens* exsert; filaments villous at base, thickened; anther-cells elliptic. *Ovary* globose, depressed, tawny-pubescent; style slender, as long as stamens; stigma shortly 2-lobed. *Drupe* ovoid, .3 in. in diam. or longer, tawny-pubescent; seed apparently 1 only. *V. simplicifolia*, Clarke in Hook. f. Fl. Br. Ind. IV. 586 (1885).

DINDINGS: Pangkore Island, *Curtis* 1611. PERAK: *Scortechini* 1383; at Telok Sera, *Ridley* 7990; in forest overlooking Bernam River, *King's Collector* 8788. MALACCA: *Griffith* (K.D.) 6064. JOHORE:

*Lake & Kelsall* on Sembrong River, 4059.—DISTRIB. Borneo (*Motley* 1269; *Beccari* 166; *Lobb, Haviland* 1580).

The name of this plant has had to be changed, as that of *simplicifolia* was already occupied by *V. simplicifolia*, Oliv. in Trans. Linn. Soc. XXIX. 133, t. 130 (1875), a Central African plant collected by the Speke & Grant Expedition.

5. *VITEX CORIACEA*, Clarke in Hook. f. Fl. Br. Ind. IV. 586 (1885). A tree, reaching 60 ft. or more in height and 15 to 20 in. in diam.; branches slender with greyish-brown fissured bark; branchlets pale brown, obscurely quadrangular, striate, puberulous. *Leaves* coriaceous, 3-foliolate; leaflets petioluled, entire, lanceolate or oblanceolate, obtuse or acute at apex, long-attenuate at base; both surfaces glabrous, upper shining, lower dull, minutely glandular, prominently reticulate; 3 to 5 in. long, 1 to 2 in. broad, the midlobe only slightly longer than the others; midrib prominent; main nerves 6 to 7 pairs, curving upwards to and along the margin where they anastomose, joined by prominent but irregular netted reticulations all raised on the lower surface; petiole 1 to 2 in. long, puberulous, angular, the apex swollen, petiolule of mid-leaflet about .5 in. long, of the side ones about .25 in. *Panicles* terminal, strict, sessile, minutely fulvous-puberulous, reaching 6 to 8 in. in length and 3 to 4 in. in breadth; branches many, elongate, ascending, subquadrangular; the main peduncles often 3 in. long or more; the flowers in small often distant clusters; bracts small, linear; flowers violet or blue. *Calyx* funnel-shaped, fulvous-pubescent, enlarged and cup-like in fruit; tube .1 in. long; lobes 5, rounded, .05 in. long. *Corolla* 2-lipped; tube fulvous-pubescent without except at the base, as also within at the insertion of the stamens, .25 in. long; upper lip 2-lobed, lobes rounded, very pubescent, ciliate, .1 in. long; lower lip 3-lobed, midlobe ovate crenate, contracted at base, shaggy-villous within, .15 in. long, side lobes rounded, reflexed, .125 in. long. *Stamens* exsert; filaments thickened, pubescent; anthers curved so as nearly to meet at the tips. *Ovary* globose, only slightly glandular; style longer than filaments, pubescent; stigma bifid, the lobes reflexed. *Drupe* ellipsoid, very smooth, .5 in. long, .25 to .35 in. broad, seated on the enlarged cup-shaped calyx; pericarp rather thin. *Seed* apparently 1 only.

KEDAH: lower slopes of Kedah Peak, *Ridley* 5555. PENANG: Government Hill, *Curtis* 323. PERAK: on Waterfall Hill, at 1000 ft., *Wray* 2225; *Scortechini* 2082; in hill forests, at 500 to 800 ft., *King's Collector* 4388, 4638, 7782, 8135. MALACCA: *Griffith* (K.D.) 6065, 1; *Maingay* (K.D.) 1203; at Ayer Panas and Bukit Bruang, *Derry* 98, 1029. SINGAPORE: *T. Anderson* 183.



6. *VITEX SIAMICA*, Williams in Bull. Herb. Boiss. Ser. 2, V. 431 (1905).

A tree with spreading branches, reaching 30 to 40 ft. in height and 15 to 20 in. in diam. of stem; branchlets rather slender, dark brown, glabrous, with prominent usually elongated lenticels. *Leaves* coriaceous-chartaceous; 3-foliolate, the leaflets all petiolulate, glabrous, entire; leaflets ovate or ovate-lanceolate, acuminate often bluntly at apex, rounded or cuneate at base, the side leaflets sometimes slightly asymmetric; the middle leaflet 2.5 to 5 in. long, .75 to 1.75 in. broad, the side ones usually about one-third smaller; midrib slender, raised beneath; main nerves 12 to 24 pairs, usually regularly spaced and parallel, only slightly curving to the margin and then anastomosing in an obscure looped marginal nerve, all raised beneath; secondary nerves and reticulations firmly netted; petiole 1 to 2 in. long, slender; petiolules about .5 in. long, the middle one only slightly longer than the others. *Panicles* terminal, with sometimes additional branches from the axils of the upper leaves, minutely puberulous, sessile, many-flowered, reaching sometimes 12 in. in length; rachises very slender, puberulous, obscurely 4-angled; branches at first 3-chotomous, ultimately ending in slender dichasia; bracts many, conspicuous, persistent, linear-lanceolate, .25 to .75 in. long; bracteoles 2 to each pedicel, similar but slightly smaller; pedicels slender, sometimes 0; flowers small, pale blue or white. *Calyx*-tube campanulate, pubescent and with glandular dots without, .05 in. long; teeth 5, acute, .025 in. long; in fruit much enlarged, cup-shaped. *Corolla* small, 2-lipped; tube .1 in. long, pubescent on both sides except at the base, and with many yellow glands; upper lip with 2 short obtuse lobes, lower with 3 obtuse lobes, the middle lobe the longest and villous inside. *Stamens* included or very slightly exsert; filaments thickened, villous; anther-cells ellipsoid, parallel. *Ovary* rounded, depressed, sparsely glandular; style rather thick, as long as stamens; stigma shortly 2-fid. *Drupe* .15 in. in diam., globose, depressed at top, obscurely 4-lobed, glandular, black when dry; pyrene with thin putamen. *Seeds* usually 1 to 2, ovate, acute at base, flattened; testa thin. *V. sympodiophora*, P. Brühl MS. in Herb. Calc. *V. lankavana*, H. H. W. Pearson, MS. in Herb. Penang.

KEDAH: at Coah, Langkawi Island, *Curtis* 1683; at Dayong Bonting, Langkawi, *Fox* 12720. PERAK: on Batu Kurau top, *Scortechini* 1618; in open jungle on the top of limestone hills, at 400 to 1000 ft., *King's Collector* 7034, 8264. SELANGOR: top of rocks, Gua Batu, *Ridley* 8535.

Brühl's description, with drawings, in the Calcutta Herbarium, is most complete, and has been of great use, especially as perfect flowers are very few on the specimens available.

7. *VITEX PUBESCENS*, Vahl Symb. III. 85 (1794). A large tree, reaching a height of 50 to 60 ft. or more; bark ash-coloured, fissured; branchlets quadrangular, brown, lenticellate; innovations tawny-pubescent. *Leaves* chartaceo-coriaceous; digitately 3- to 5-foliolate, the middle leaflet always largest, the two next large, the basal pair when present much smaller; leaflets entire, sessile or subsessile, obovate or elliptic or broadly lanceolate, obtuse or acuminate at apex, rounded or cuneate at base; glabrescent on the upper surface except on the nerves, minutely pubescent on the lower surface; middle leaflet 6 to 8 in. long by about 3 in. broad, rest smaller in gradation; midrib stout; main nerves 12 to 20 pairs, regular, curving gently upwards and connected by prominent nearly parallel transverse nervelets; petiole 2 to 4 in. long, deeply channelled above; petiolules when present under .25 in. long. *Panicles* terminal, densely tawny-pubescent, pyramidal, usually sessile, reaching 10 in. in length and 6 to 8 in. in breadth; rachises sharply quadrangular; branch peduncles often 3 to 4 in. long; bracts many, conspicuous, persistent, ovate or spatulate, those of main nodes sometimes leaf-like; bracteoles similar to the bracts but smaller; pedicels none or very short; flowers blue or lilac. *Calyx* campanulate, thickly tomentose, .15 to .25 in. long; lobes 5 acute. *Corolla* 2-lipped, gibbous; tube broad, pubescent and glandular without except at the base, villous within at the insertion of the stamens, glabrous below it, about .25 in. long; upper lip 2-lobed, lower 3-lobed, the midlobe much the longest, villous within and concave at tip, the others rounded, reflexed. *Stamens* exsert; filaments broad and villous at the base; anther-cells elongate, connected only at tip. *Ovary* glabrous; style slender, longer than stamens; stigma shortly bifid. *Drupe* black, globose, .2 to .3 in. long, depressed at top, faintly ribbed, 4-celled. Schauer in DC. Prodr. XI. 685; Blume Bijdr. 812; Dene. in Nouv. Ann. Mus. d'Hist. Nat. III. 401; Bedd. Fl. Sylv. XXI.; Kurz For. Fl. II. 271; Miq. Fl. Ind. Bat. II. 861; Clarke in Hook. f. Fl. Br. Ind. IV. 585; Koord. & Val. Bijdr. VII. 202; Prain Beng. Plants 833. *V. arborea*, Roxb. Hort. Beng. 46, and Fl. Ind. III. 73; Jack in Mal. Misc. I. 18, and in Hook. Bot. Misc. I. 285; Wall. Cat. 1747; Wight Ic. t. 1465. *V. inæquifolia*, Turcz. in Bull. Soc. Imp. Nat. Mosc. II. 223.

PENANG: Wallich 1747 part; J. Scott; Curtis 64. PERAK: at Thaipeng, Wray 139; King's Collector 267; Scortechini 77, 99, 916. MALACCA: Griffith; Maingay (K.D.) 1204; Derry. SINGAPORE: Wallick 1747 part; Schomburgk 48; Cantley 17; Ridley.—DISTRIB. India, Burma, Malay Archipelago.

8. *VITEX HETEROPHYLLA*, Roxb. Hort Beng. 46 (1814), and Fl. Ind. III. 75 (1832). A large tree, reaching 80 ft. in height and 3 ft. in diam.

of stem; branchlets quadrangular, dark grey, lenticellate, gland-dotted. *Leaves* chartaceous; 5-foliolate, the middle leaflet longest, the next pair not much smaller, the lowest pair sometimes nearly as long, sometimes reduced, all petiolulate or the lowest sometimes sessile; leaflets entire, variable, elliptic or elliptic-oblong or -ovate or -obovate, often long-cuspidate-acuminate at apex, attenuate or somewhat rounded at base, the side leaflets usually unequally; both surfaces glabrous, dark reddish-brown when dry, the upper with white, the lower with yellow glands; middle leaflet 5 to 7 in. long, 3 to 4 in. broad, the rest smaller in proportion; midrib stout, slightly impressed above, raised beneath; main nerves 7 to 10 pairs curving upwards to and along the margin and joined by fairly regular and prominent transverse nervules; petiole 3 to 6 in. long, terete below and flattened above; petiolule of middle leaflet .5 to 1 in. long, of next pair about .5 in., of the lowest pair 0 to .25 in. long. *Panicles* terminal, the lowest nodes often leafy, thinly cinereous-tomentose, usually sessile, thyrsoïd, reaching 12 in. in length and 8 in. in diam.; branches opposite, elongate, quadrangular, bearing interrupted pairs of cymules usually .5 to .75 in. long; bracts 0 or very small; pedicels very short; flowers pale yellow with a blue lip. *Calyx* tubular campanulate, grey-pubescent and glandular, .1 in. long, enlarged and broadened and ribbed in fruit; teeth 5, small, acute. *Corolla*-tube broadly funnel-shaped, pubescent and dotted with yellow glands without, glabrous within except a row of villous hairs within below the insertion of the stamens; 2-lipped, the upper lip of 2 recurved acute lobes .1 in. long, the lower of 3 lobes, the side ones recurved, obtuse, .1 in. long, the middle one oblong, .15 in. long, villous on the throat. *Stamens* exserted, curved; filaments glabrous; anther-cells oblong, at first curved downwards, afterwards divaricate. *Ovary* rounded, glabrous except a few glandular dots; style slender, thickened above; stigma shortly 2-lobed. *Drupe* pyriform, depressed at top, sparsely glandular, blackish-grey and wrinkled when dry; pyrene very hard, ribbed, hollowed at base. *Seeds* oblong, flattened, .2 in. long, .075 in. broad; testa thin, spongy; cotyledons oblong, .1 in. long; radicle .04 in. long. Wall. Pl. As. Rar. 15, t. 226, and Cat. 1745; Schauer in DC. Prodr. XI. 686 *partly*; Clarke in Hook. f. Fl. Br. Ind. IV. 585; Prain Beng. Plants 833.

PERAK: at Tapa, Wray 197; in hill forests up to 1000 ft., King's Collector 6034, 7530, 10063, 10377.—DISTRIB. India (Sikkim, Assam and East Bengal).

9. VITEX SUMATRANA, Miq. Fl. Ind. Bat. Suppl. 567 (1860).

VAR. *urceolata*, King & Gamble. A tree, reaching 40 to 60 ft. in height and 2 ft. in diam. of stem; branchlets quadrangular, channelled

at the sides from raised lines descending from the sides of the petiole, glabrous or very slightly puberulous. *Leaves* chartaceous, 3- to 5-foliate, the middle leaflet longest, the next pair not much smaller, the lowest pair a good deal smaller, all petiolulate or the lowest pair subsessile; leaflets entire, obovate or oblong-obovate, shortly suddenly acuminate at apex, rounded often unequally at base; upper surface glabrous, except on the nerves, olivaceous-brown, shining, rough, minutely white-gland-dotted; lower surface glabrous, paler than the upper, with minute yellow glands; middle leaflet 4 to 6 in. long, 2.5 to 3 in. broad, rest gradually smaller but similar; midrib strong, impressed above; main nerves about 10 pairs, irregular, curving upwards to and along the margin and joined by rather irregular transverse nervules; petiole 1.5 to 4 in. long, quadrangular but not winged; petiolule of middle leaflet about 1 in. long, of next pair about .5 in. long, of the lowest pair 0 to .25 in. long. *Panicles* terminal, thinly cinereous-tomentose, thyrsoïd, usually sessile, reaching 8 in. in length and 5 in. in diam.; branches elongate, cylindric, bearing interrupted whorls of pairs of many-flowered cymules about .5 in. long; branch-peduncles 1 to 2 in. long; bracts linear .1 to .15 in. long, recurved, deciduous; buds large, reaching .25 in. long. *Calyx* tubular-campanulate, .15 in. long, flattened in fruit and enlarged; tube tawny-pubescent and glandular without, glabrous within; teeth short, acute, rounded in fruit. *Corolla*-tube curved, contracted at the throat, .25 in. long, pubescent without except at the base, quite glabrous within; 2-lipped, upper lip of 2 erect crenate lobes .1 in. long, lower of 3 lobes, midlobe broad, crenate, obtuse, .2 in. long, side lobes shorter, reflexed, all pubescent without, glabrous within. *Stamens* curved, exsert; filaments glabrous; anther-cells attached only at one point, curving to nearly erect. *Ovary* conical, with a few glands on its top; style thickened, sigmoid below, glabrous; stigma shortly 2-lobed. *Drupe* globose, depressed, .3 to .5 in. long, shortly apiculate, wrinkled when dry; pyrene very hard. *Seeds* flattened, oblong; testa thin, spongy. *V. urceolata*, Clarke in Hook. f. Fl. Br. Ind. IV. 585 (1885). *V. heterophylla*, Schauer in DC. Prodr. XI. 686 partly. *V. Loureirii*, Herb. Wight; not of Hook. & Arn.

PERAK: in Upper Perak, at 300 ft., Wray 3653; *Scortechini* 61; in dense mixed jungle, at 400 to 600 ft., King's Collector 10406. MALACCA: Griffith (K.D.) 6064; Maingay (K.D.) 1205, 1207.

As pointed out by Clarke, this variety differs in the glabrescent foliage, larger flowers and larger drupes. *V. heterophylla*, Roxb., with which Koorders & Valetton would combine *V. urceolata*, has different leaves and inflorescence and a corolla villous within.

10. *VITEX PTEROPODA*, Miq. Fl. Ind. Bat. Suppl. 567 (1862). A tree, reaching 40 to 60 ft. in height and a considerable diameter of stem; branchlets stout, pale brown, obscurely quadrangular. *Leaves* coriaceous; 5- to 7-foliolate, only the lowest pair much smaller than the others; petiole prominently and very broadly winged; leaflets long, lanceolate or oblong-lanceolate or oblanceolate, acuminate at apex, cuneate at base; both surfaces glabrous, minutely dotted and so scabrid to the touch; margins recurved; 4 to 20 in. long, 1 to 2.5 in. broad; midrib stout; main nerves 12 to 16 pairs, prominent on the lower surface, at first somewhat straight and then curving to and along the margin till they meet, joined by prominent transverse nervules and reticulations; petiole 4 to 7 in. long, broadly winged, the wings broadest (1 to 1.5 in. on either side) at a short distance from the base, sometimes narrowed only near the top, sometimes earlier and then curving upwards, often cordate or auricled at both ends; petiolules .5 to 1 in. long, bordered by the decurrent margins of the leaflet blades. *Panicles* terminal or partly axillary to uppermost leaves, subsessile, glabrous, reaching 1 ft. in length and about 8 in. in diam.; rachises slender, angular, striate or channelled; peduncles of all classes, primary secondary and tertiary, long, ending in few sparse few-flowered short cymes scarcely .25 in. long; bracts linear, acuminate, .1 to .15 in. long, persistent; bracteoles under the calyx similar but shorter; pedicels 0 or very short; flowers white with a pink tinge. *Calyx* urceolate, glabrous, .1 in. long; teeth 5, acute. *Corolla*-tube short, .075 to .1 in. long, puberulous without, glabrous or very slightly villous within near the base; lobes short, obtuse. *Stamens* scarcely exsert; filaments villous; anther-cells ellipsoid, nearly parallel. *Ovary* globose, much depressed, glabrous; style slender; stigma shortly 2-forked. *Drupe* ovoid-oblong, .75 to 1 in. long, .5 in. in diam., smooth, seated on the spreading, much enlarged calyx; pericarp very thick; seed 1.

PERAK: *Scortechini*; in dense jungle or low ground near Larút, *King's Collector* 5249, 6668.—DISTRIB. Sumatra (*Teysmann*).

It is unfortunate that we could only find, in all the specimens available, one broken and imperfect corolla. The tree is a remarkable one, and is clearly very nearly allied to *V. per-alata*, King, but differs in the long narrow leaflets with scabrid points, the glabrous, usually terminal, sparsely flowered panicles, short corolla-tube and smaller drupes. The broad wings to the petioles are much the same in both. The specimen of *Teysmann's* at Kew consists only of a couple of leaflets about 20 in. long.

11. *VITEX PER-ALATA*, King MS. in Herb. Calc., Kew Bull. 112 (1908). A spreading tree, reaching 80 ft. in height and 2 ft. in diam. of stem; branchlets very thick, angular, striate, dark brown. *Leaves*

coriaceous; 5- to 7-foliolate, only the lowest pair much smaller than the others; petiole prominently and very broadly winged; leaflets elliptic or elliptic-obovate, acute at apex, long-attenuate at base; both surfaces glabrous; margins recurved; middle lobe 6 to 20 in. long, 3 to 6 in. broad, the rest smaller in proportion; midrib stout, impressed above, raised beneath; main nerves 10 to 14 pairs, prominently raised beneath, curving upwards to and along the margin, joined by a conspicuous (on upper surface) network of reticulations; petiole 3 to 6 in. long, the wings broad below and almost cordate, the breadth (the broadest at 1 to 2 in. above the base) reaching 1·5 to 2 in. on either side at widest, curving upwards rather abruptly or gradually to the top, and veined like the leaves; petiolules often 0, when present scarcely reaching ·25 in. long. *Panicles* terminal or sometimes axillary to the uppermost leaves, sessile or peduncled, puberulous, reaching 2 ft. in length and about 1 ft. in diam.; rachises angular, channelled; peduncles up to 8 in. long, very stout, somewhat flattened; secondary peduncles of branches in whorls of 4 around the main rachis, up to 5 in. long; flowers in short opposite or alternate many-flowered cymes, about ·5 in. long, along the branches; bracts linear-lanceolate, ·1 to ·2 in. long, persistent; pedicels 0 or very short; flowers light blue with brown markings. *Calyx* pink, shortly urceolate, tawny-pubescent, ·1 to ·15 in. long; teeth short, acute, in fruit slightly enlarged and recurved. *Corolla*-tube campanulate, ·25 in. long, pubescent without, villous within around the point of insertion of the stamens and up to the midlobe of the lower lip; upper lip of 2 ovate acute lobes ·1 in. long, the lobes reflexed; lower lip of 3 lobes, side lobes oblong, rounded, ·15 in. long, reflexed; midlobe broad, obtuse, ·2 in. long, all puberulous. *Stamens* exsert; filaments flattened at base, villous hairy; anther-cells ellipsoid, rather short, slightly divaricate. *Ovary* rounded, depressed, villous at top, glabrous below; style slender, slightly longer than the stamens; stigma shortly 2-forked. *Drupe* ovoid-conoidal, smooth, longitudinally ribbed, 1·5 in. long by 1 to 1·25 in. broad; pericarp very thick; pyrene with rather soft shell. *Seed* 1; testa membranous; cotyledons orbicular, flat.

PERAK: at Simpang, *Wray* 2029, 2254, 2305; in dense jungle on low wet ground near Larut, *King's Collector* 2064, 6187, 6874, 8299.

This must be a splendid tree and worthy of cultivation for ornamental purposes. The large fruit, resembling that of the walnut, and the broad wings to the leaf-petioles are very characteristic.

12. *VITEX GLABRATA*, Br. Prodr. Fl. Nov. Holl. 512 (1810). A large tree; branchlets pale brown, obscurely quadrangular; innovations

fulvous-tomentose. *Leaves* chartaceous; digitately 3- to 5-foliate, the lowest pair rather smaller than the others, the middle leaflet slightly larger; leaflets entire, petiolulate, obovate elliptic or elliptic-oblancoate, acuminate at apex often obtusely, attenuate or cuneate at base; both surfaces grey-pubescent when young, afterwards glabrate or with scattered appressed hairs and a few glands beneath, the nerves beneath pubescent and with tufts of hair in the axils; 2 to 6 in. long, 1·5 to 2·5 in. broad; midrib slender, impressed above, raised beneath; main nerves 10 to 20 pairs, regular, slender, the uppermost ones obscure, slightly curved to the margin; transverse nervules and reticulations obscure; petiole 3 to 6 in. long, angular, channelled above; end petiolules ·75 to 1 in. long, rest ·25 to ·5 in. long, angled and channelled. *Cymes* axillary, corymbose, peduncled, puberulous, reaching 4 to 5 in. in length and 2 to 3 in. in diam.; peduncles slender, angular, up to 2 in. long; branches markedly dichotomous, spreading; bracts linear, pubescent, caducous; pedicels slender, 0 to ·1 in. long; flowers white, the lip blue-purple. *Calyx* campanulate, ·05 to ·1 in. long, pubescent without, enlarged in fruit; teeth 5, very short, acute. *Corolla*-tube broadly cylindric, ·2 in. long, pubescent without, glabrous within except a ring of villous hairs at the insertion of the stamens, the hairs extending up the midlobe of the lower lip; upper lip with 2 obtuse recurved lobes ·15 in. long; lower lip 3-lobed, the side lobes recurved, ·15 in. long, the midlobe spreading, ·25 in. long, densely villous. *Stamens* much exsert; filaments villous; anther-cells short, ellipsoid, divaricate. *Ovary* globose, pubescent at top; style slender, as long as stamens; stigma spreading. *Drupe* ovoid or obovoid, succulent, ·3 to ·5 in. in diam., smooth. Schauer in DC. Prodr. XI. 695; Benth. Fl. Austral. V. 68; Clarke in Hook. f. Fl. Br. Ind. IV. 588; Koord. & Val. Bijdr. VII. 208; Prain Beng. Plants 833. *V. Cunninghami*, Schauer l.c. 691. *V. leucoxydon*, Schauer l.c. 692 in part; Kurz For. Fl. II. 273; Miq. Fl. Ind. Bat. II. 864, not of Linn. f. *V. bombacifolia*, Wall. Cat. 1749; Walp. Rep. IV. 86. *V. pallida*, Wall. Cat. 1751.

KEDAH: in dense jungle near sea-level, *Kunstler* 1763. PENANG: *Curtis* 1071.—DISTRIB. India (Assam to Chittagong), Burma, Java, Siam, Cochin China, North Australia and Queensland.

13. *VITEX LONGISEPALA*, King & Gamble in Kew Bull. 112 (1908). A small or moderate-sized tree; branchlets rather stout, obscurely quadrangular, softly tawny-pubescent as are the innovations. *Leaves* membranous; trifoliate, the middle leaflet largest and petiolulate, the side ones subsessile; leaflets ovate or elliptic-ovate, abruptly caudate-acuminate at apex, the middle leaflet acuminate or cuneate at base, the

side ones cordate or rounded or acute and unequal; the upper surface sparsely hispid and gland-dotted, the lower tawny-pubescent, villous on the nerves and gland-dotted; margins entire; 4 to 12 in. long, 2 to 6 in. broad; midrib stout; main nerves 8 to 15 pairs, curving outwards to and along the margin and joined by many transverse nervules and reticulations; petiole 2 to 6 in. long, densely tawny-pubescent; petiolule of middle leaflet .25 to 2 in. long, of side leaflets none or under .5 in. long; *Cymes* axillary, opposite, tawny-pubescent, 1 to 2.5 in. long; main peduncles usually 2, vertically arranged, 1 to 1.5 in. long; branches 2- to 3-chotomous, spreading, corymbose; bracts conspicuous, narrowly lanceolate, .25 to .75 in. long, persistent; pedicels about 1 in. long; flowers primrose-yellow. *Calyx* villous, with golden brown hairs; tube campanulate, .1 in. long; lobes 5 subequal, oblong-lanceolate, .25 in. long, conspicuous. *Corolla*-tube slender, funnel-shaped, .4 to .5 in. long, prominently dotted with yellow glands; 2-lipped with a scanty ring of hairs within at the insertion of the stamens, .15 in. above the base of; upper lip shortly 2-lobed, the lobes rounded; lower lip 3-lobed, side lobes reflexed, middle lobe narrowed below, broadened above and fimbriate, twice as long as side lobes. *Stamens* exsert: filaments glabrous, slender; anther-cells elongate, narrow, parallel. *Ovary* conoidal on a cylindric base, the top densely yellow-glandular; style slender; stigma bifid. *Drupe* ovoid, black, smooth, gland-dotted, .3 in. long; pyrene hard, reticulately ridged, with 3 to 4 fertile cells near the top and a large cavity below. *Seeds* obovoid, slightly flattened, .075 in. long; testa thin.

PENANG: at Batu Kawan, *Curtis* 395. PERAK: at Bujong Malacca, *Ridley* 9723; at Tapa, *Wray* 1319; at Waterloo, *Curtis*; *Scortechini* 100, 113, 340; in open jungle, Goping, *King's Collector* 460. SELANGOR: *Ridley* 7595; at Rawang, *Goodenough* 10488.

This species is very near indeed to *V. vestita*, but differs in the much larger leaves and the prominent large bracts and calyx-lobes.

14. *VITEX VESTITA*, Wall. Cat. 1750 (1828). A moderate-sized tree; branchlets rather slender, obscurely quadrangular, softly grey-tawny-pubescent as are innovations. *Leaves* membranous; trifoliate, all three leaflets petioluled, the mid-leaflet much the largest; leaflets elliptic or elliptic-lanceolate, long-acuminate at apex, the middle leaflet equally acuminate at base, the side ones rounded or acute with more or less unequal sides; the upper surface sparsely hispid and gland-dotted, the lower softly tawny-pubescent, villous on the nerves, also yellow-gland-dotted; margins entire; 3 to 7 in. long, 1.5 to 4 in. broad; midrib stout; main nerves 8 to 10 pairs, curving upwards to



and along the margin and joined by prominent rather irregular nervules and reticulations; petiole usually slender, 2 to 3 in. long, petiolule of middle leaflet 1 to 1·5 in. long, of side leaflets ·25 to ·5 in. long. *Cymes* axillary, opposite, sessile, tawny-pubescent, 1 to 1·5 in. long, 2- to 3-chotomous; main peduncles usually 2, sometimes more, one above the other vertically, ·25 to ·5 in. long; branches 2- to 3-chotomous, corymbose, spreading; bracts minute, linear, caducous; pedicels slender, 0 to ·1 in. long; flowers yellow (*Kunstler*). *Calyx* campanulate, densely pubescent and gland-dotted without, ·1 to ·15 in. long, subtruncate or 2-lipped, enlarged and saucer-shaped in fruit; lobes acute, short. *Corolla*-tube slender, 2-lipped, narrow, cylindric, ·4 to ·5 in. long, glabrate without and with large yellow glands, glabrous within except for a villous ring about ·1 in. above the base and as far below the insertion of the stamens; upper lip shortly 2-lobed, lower 3-lobed, the midlobe slender, hardly longer than the others. *Stamens* included; filaments glabrous; anther-cells elongate, narrow, curved downwards, each ending in an oblong empty appendage about half as long as the cell. *Ovary* densely covered with yellow glands, oblong, obtuse; style slender. *Drupe* oblong, ·3 to ·4 in. long and ·25 in. broad, sparsely gland-dotted; pyrene hard, reticulately ridged, with 3 to 4 fertile cells near the top and a large empty cavity below. *Seeds* obovoid, flattened, acute at base, ·06 in. long; testa thin; cotyledons elliptic, fleshy; radicle small. Schauer in DC. Prodr. XI. 692; Miq. Fl. Ind. Bat. II. 864; Kurz For. Fl. II. 272; Clarke in Hook. f. Fl. Br. Ind. IV. 587. *V. Finlaysoniana*, Wall. Cat. 6314.

PENANG: *Wallich* 1750 B, *G. King*; at Penara Bukit, *Curtis* 265. PERAK: on Maxwell's Hill, *Wray* 699; *Kunstler* 176. SELANGOR: at Bukit Kutu, *Goodenough* 10547. MALACCA: *Griffith* (K.D.) 6063; *Cuming* 2351; *Derry* 656, 899. JOHORE: at Jaffaria, *G. King*. SINGAPORE: at Sungei Jeeroo, *Ridley* 3867; at Chenchukang, *Goodenough* 2792.—DISTRIB. Burma, *Wallich* 1750 A; Sumatra, Borneo.

15. *VITEX GAMOSEPALA*, Griff. Notul. IV. 178, and Ic. Pl. Asiat. t. 448, fig. 2 (1854). A slender moderate-sized tree; branchlets dark brown, prominently lenticellate, innovations fulvous-hairy. *Leaves* chartaceous; trifoliolate, all three leaflets petiolulate, the mid-leaflet somewhat the largest; leaflets entire, ovate or lanceolate, long-acuminate at apex, the side leaflets acute and slightly unequal at base, the mid-leaflet acuminate; both surfaces glabrate except on the nerves beneath, the lower glandular, brown when dry, the upper olivaceous; 3 to 7 in. long, 1·5 to 2·5 in. broad; midrib stout, raised beneath; main nerves 5 to 7 pairs, curving acutely upwards to and along the margin where they meet, joined by an irregular network of nervules, prominently

raised beneath when dry; petiole slender, terete, 2 to 4 in. long; petiolule of mid-leaflet .75 to 1 in. long, of side leaflets .25 in. long. *Cymes* axillary, sessile, corymbose, sparingly fulvous-hairy, 2-chotomous below, 3-chotomous above, reaching 1.5 in. long or more; bracts short, linear, caducous; pedicels slender, 0 to .1 in. long; flowers pale yellow. *Calyx* 2-lipped; tube ovoid, .1 in. long, densely glandular without as are the lobes; upper lip entire, oblong, .275 in. long; lower lip 2-lobed, .075 in. long, the lobes rounded; in fruit split on one side to the base and enlarged to a beaked shallow cup. *Corolla* funnel-shaped; tube .35 in. long, with a ring of hairs within near the base; upper lip entire or shortly 2-lobed, lower 3-lobed, the middle lobe .125 in. long, 2-fid, the side lobes .06 to .1 in. long; tube and lobes, except the ends of the middle lobe of the lower lip which are usually incurved, all covered with prominent large shining yellow glands. *Stamens* exsert; anthers sparsely pilose near the base; cells elongate, parallel, each with a short empty beak. *Ovary* conical, densely glandular; style slender, glabrous; stigma shortly 2-lobed. *Drupe* obovoid, black, slightly glandular, fleshy, .3 in. long, .25 in. in diam.; pyrene very hard, reticulately ridged, hollow at the base, the 3 to 4 cells near the top bearing seeds. *Seeds* oblong, beaked below, .05 in. long; testa thin; cotyledons fleshy, convex, elliptic; radicle minute. Benth. in Gen. Pl. II. 1154; Clarke in Hook. f. Fl. Br. Ind. IV. 588.

PERAK: at Larút, *Scortechini* 445, 1480; in dense forest near Larút, at 500 to 1000 ft. alt., *Kunstler* (*King's Collector*) 1841. SELANGOR: at Kwala Lumpur and on Pahang road, *Ridley* 8546, 10218, 10479; *Curtis* 2366. MALACCA: at Chin Rhingull, *Griffith* (K.D.) 6065; *Maingay* (K.D.) 1202. SINGAPORE: at Changi, *Ridley* 2788.

As pointed out by Clarke, this species in its inflorescence and corolla, and, it may be added, in its fruit, shows a great affinity to *V. vestita*. But the calyx distinguishes it at once, and the leaves differ a good deal. *Griffith's* fig. represents the anthers only.

VAR. *Scortechinii*, King & Gamble. *Cymes* shorter and few-flowered. *Calyx* much shorter, the upper lip only .075 in. long, the lower .025 in. with more acute lobes. *Corolla* similar, but middle lobe of lower lip entire and yellow glands much fewer and less prominent.

PERAK: *Scortechini*; at Bujong Malacca, *Ridley* 9725; at Tapa Batang Padang, *Wray* 180; at lower camp, Gunong Batu Pateh, 3400 ft., *Wray* 992, 1080. NEGRI SEMBILAN: at Seremban, *Ridley* 10096.—DISTRIB. Sumatra (*Forbes* 3060).

VAR. *Kunstleri*, King & Gamble. *Leaflets* ovate, acuminate at apex and base, 2 to 3 in. long, 1 to 1.5 in. broad; petiole 1 to 2 in. long; petiolule of end leaflet .5 in., of side leaflets .25 in. long. *Calyx* 2-lipped;

short, .1 in. long; upper lip .075 in. long, acute or rounded, often 2-lobed; lower lip acutely 2-lobed, the lobes .05 in. long. *Corolla*-tube slender, .45 in. long, very glandular; upper lip shortly 2-lobed; lower lip 3-lobed, side lobes short, narrow, midlobe longer, obtuse. *Anther*-cells with a short rounded beak. Otherwise as in type.

PERAK: at Ulu Bubong, in open jungle at 400 to 600 ft., *King's Collector* 10605. TRINGGANU: at Bunda, *Rostado* (Herb. *Ridley* 11982). —DISTRIB. Sumatra (*Forbes* 2685).

This is a well-marked variety, but is not quite deserving of specific rank.

### Tribe III. CARYOPTERIDEE.

#### 11. PERONEMA, Jack.

A small tree; branchlets grey-tomentose. *Leaves* opposite, imparipinnate; leaflets sub-opposite, in several pairs, entire. *Inflorescence* of large compound, spreading, terminal, trichotomous panicles of corymbose cymes; flowers very small; bracts small, setaceous. *Calyx* campanulate, 5-partite, not accrescent. *Corolla*-tube short; limb 2-lipped, 5-lobed, the midlobe of the lower lip longer than the rest. *Stamens* 2, involute in bud, exsert; anthers broadly ovate-reniform with parallel cells. *Ovary* 4-celled, the cells 1-ovuled; style filiform; stigma entire or bifid; ovules attached laterally near the top of the placenta. *Fruit* a small globose capsule of 4 crustaceous valves, the valves separating from the base together with the adjoining portions of the central placenta. *Seeds* attached centrally near their top, pendulous, exalbuminous; testa thin, as are the cotyledons; radicle minute.—DISTRIB. One species, Malayan.

PERONEMA CANESCENS, Jack in Mal. Misc. II. No. 7, 46 (1822). A small tree; bark grey; branchlets stout, grey, obtusely quadrangular; pith quadrangular. *Leaves* chartaceous, reaching 1 to 2 ft. in length; pinnules 7 to 9 pairs, the upper pairs usually opposite, the lower sub-opposite or nearly alternate; the rachis winged, the wings narrow, from .05 to .25 in. broad; petiole 2 to 7 in. long; leaflets sessile, lanceolate, acuminate at apex, cuneate at base, gradually increasing in size upwards, from 1 in. by .5 in. at the base to as much as 9 in. by 2.5 in. at the tip; upper surface glabrous, lower puberulous, tawny-canescens; margins entire or serrate; midrib prominent; main nerves 20 to 30 pairs, regular, straight, joined by loops near the margin; reticulations netted. *Panicle* reaching 12 in. in length and about 20 in. in breadth, tawny-puberulous; peduncle stout; rachis quadrangular; lower branches opposite, long- (4 to 5 in.) peduncled, ending, as the upper ones, in corymbose, many-flowered cymes; bracts scarcely .2 in. long,

bracteoles very small, numerous; pedicels slender, very short; buds globose; flowers white. *Calyx* .1 in. long; lobes acute, glabrous within. *Corolla* glabrous within, pubescent without; lower midlobe .15 in. long, the rest .1 in. *Stamens* deflexed; filaments thickened towards the base. *Ovary* villous, as is the base of the style. *Capsule* densely tawny-pubescent, .125 in. broad, .1 in. long. Hook. Comp. Bot. Mag. I. 152; Wall. Cat. 9075; Schauer in DC. Prodr. XI. 627; Wight Ic. t. 1460; Griff. Notul. IV. 177; Miq. Fl. Ind. Bat. II. 909; Clarke in Hook. f. Fl. Br. Ind. IV. 599; Koord. & Val. Bijdr. VII. 214. *P. heterophyllum*, Miq. Fl. Ind. Bat. Suppl. 570.

PENANG: Racecourse, *Curtis* 2427. PERAK: at Ijuk, *Scortechinii* 1160. MALACCA: *Griffith* (K.D.) 6015. PAHANG: *Ridley* 2247. SINGAPORE: at Bukit Mandai, *Ridley* 3993.—DISTRIB. Sumatra (*Teysmann*, *Forbes* 2655), Java, Borneo (*Motley* 870).

## 12. PETRÆOVITEX, Oliver.

Shrubs, usually climbing. *Leaves* opposite, simple or 3-foliolate or bipinnate, petiolate. *Inflorescence* of terminal or axillary panicle cymes with puberulous spreading branches; bracts subulate; flowers very small, shortly pedicellate. *Calyx* short, campanulate, much accrescent after flowering, the tube then long, and the lobes converted into ob lanceolate scarious reticulate wings. *Corolla* oblique, 2-lipped; the lobes obtuse, incurved at the tip. *Stamens* 4, subequal or didynamous; exsert or included; anthers oblong; cells parallel. *Ovary* obovoid, imperfectly 2-celled, cells 2-ovuled; ovules pendulous; style slender; stigma bifid. *Fruit* capsular, oblong or wedge-shaped; exocarp thin. *Seeds* 2 (or 1 by suppression), attached to the central placenta; testa membranous; albumen none; cotyledons oblong or obovate, emarginate, fleshy; radicle thick, inferior.—DISTRIB. About 3 species, native of the Malay Peninsula and Archipelago.

Tawny-pubescent; leaves 3-foliolate, leaflets under 3 in. long;

capsule prominently ribbed .. .. 1. *P. Scortechinii*.

Glabrous or very slightly puberulous; leaves 1 to 3-foliolate,

leaflets over 3 in. long; capsule not ribbed .. .. 2. *P. bambusetorum*.

1. PETRÆOVITEX SCORTECHINII, King & Gamble in Kew Bull. 113 (1908). A shrub, perhap sclimbing; branchlets pale brown, somewhat angular, puberulous; innovations tawny-pubescent. *Leaves* opposite, membranous, trifoliolate; end leaflet ovate, shortly and obtusely acute at apex, rounded or slightly cuneate at base; 2 to 3 in. long, 1 to 2 in. broad; upper surface minutely pubescent, lower grey-pubescent; margins entire or undulate, main nerves 4 pairs, curving sharply upwards; side

leaflets similar but rather smaller and usually somewhat unequally cordate at base; petiole 1·5 to 2 in. long; petiolule of end leaflet ·5 to ·75 in. long, of side leaflets ·25 in. long, all pubescent. *Cymes* in axillary, tawny-pubescent, 3- or 2-branching panicles up to 6 in. long, the uppermost very short and few-flowered; bracts leafy, nearly orbicular, ·5 to ·75 in. in diam., pale; pedicels short. *Calyx* deeply-cleft, tawny-pubescent; lobes 5 or 4, oblong or spatulate, ·25 in. long; fruiting calyx much enlarged; the tube ·25 in. long, enclosing the fruit; the 5 or 4 lobes expanded into elliptic oblong shining scarious lobes ·75 to 1 in. long, having 3 to 5 longitudinal nerves and prominent netted reticulation. *Corolla* very small (buds only available), 2-lipped; lobes spatulate, concave, ·1 to ·15 in. long. *Stamens* 4 exsert, 2 lower longer than the 2 upper; filaments short; anther-cells of upper pair parallel, of lower slightly divaricate. *Ovary* cylindric, villous, obtuse at top, 2-celled; style short; stigma 2-lobed, the lobes spreading. *Fruit* capsular, oblong or wedge-shaped, obtuse and pubescent at tip, ·2 to ·25 in. long; exocarp chartaceous, striate. *Seeds* 2 (or 1 by suppression); cotyledons obovate, obliquely obtuse, emarginate, ·15 in. long, ·1 in. broad.

PERAK: *Scortechini* 753 (or 1753 ?).

2. *PETRAEOVITEX BAMBUSETORUM*, King & Gamble in Kew Bull. 113 (1908). A creeper reaching 30 to 50 ft. long and 2 to 3 in. in diam. (*King's Collector*); branches smooth, pale brown. *Leaves* opposite, chartaceous, 1- or 3-foliolate; leaflets ovate, acuminate at apex, rounded or slightly cuneate at base; 3 to 4 in. long, 1·5 to 2·5 in. broad; both surfaces glabrous; margins entire; main nerves about 8 pairs, straight to join a looped intramarginal nerve rather far from the edge; reticulations netted, raised, prominent beneath; petiole 1 to 2 in. long; petiolules ·25 to ·5 in. long, slender, the end one slightly the longest. *Cymes* in sessile or peduncled, thyrsoid, axillary, glabrous or puberulous panicles reaching 4 to 5 in. long and about 3 in. broad; rachis angular, very slender as are the branches and pedicels; bracts leafy, lanceolate, long-acuminate; bracteoles minute, setaceous; pedicels very short; buds ovoid. *Calyx* in bud very small, scarcely ·05 in. long, with triangular acute teeth; gradually enlarging later until in fruit it has a tube ·25 to ·35 in. long and strongly ribbed, with oblong-spatulate, membranous, shining lobes ·4 to ·5 in. long and ·1 to ·15 in. broad; the lobes prominently 3-nerved and reticulate. *Corolla* very small (buds only available), 2-lipped, the upper lip slightly 2-lobed, the lower deeply 3-lobed, all very small and glabrous. *Stamens* 4, subequal; filaments stout; anthers oblong with parallel cells. *Ovary* rounded; style short; stigma 2-lobed. *Fruit* capsular, wedge-shaped, slightly convex above, ·3 in. long; exocarp thin pubescent, not ribbed. *Seeds* 2 (or 1

by suppression); testa membranous; cotyledons obovate, truncate and slightly emarginate.

PERAK: in dense bamboo forests, at 500 to 700 ft., near Ula Kerling, *King's Collector* 8765.—DISTRIB. Borneo (*Haviland* 1913; *Ridley* 9065).

The Perak specimens are rather poor ones, with flowers in bud and very young fruit, and they have 3-foliate leaves, while the Borneo specimen is unifoliate and in fruit; so that it is not quite certain that they belong to the same species, but after very careful examination we believe that they do, as the leaflets are identical and so are the nerves of the fruiting calyx.

The genus *Petræovites* was founded by Prof. D. Oliver on *P. Riedelii*, Oliv., in Hook. f. Ic. Pl. V. 15. t. 1420 (1883), a plant sent from the Island of Buru by Mr. Riedel, and remarkable for its bipinnate leaves.

#### Tribe IV. SYMPHOREMEÆ.

##### 13. SPHENODESME, Jack.

Climbing shrubs. *Leaves* opposite, entire. *Inflorescence* of capitate, 3- or 7-flowered, centrifugal cymes enclosed in an involucre of 6 foliaceous accrescent bracts, the cymes in pairs on the branches of large terminal or axillary, leafy, thyrsoid panicles. *Calyx* ovoid-campanulate, usually enlarging after flowering; lobes of 5 rather short teeth. *Corolla* sub-regular; tube short, cylindric; lobes 5, rarely 6, subequal, imbricate in bud. *Stamens* 5, inserted in the tube of the corolla below the throat, included or exsert; anthers small, oblong or reniform, the cells parallel or divergent. *Ovary* 2-celled, the cells 2-ovuled; ovules pendulous from the apex of the placentiferous axis; style filiform, short or long; stigma 2-lobed. *Drupe* globose or obovoid, included in the calyx, 1-seeded or rarely 2-seeded; exocarp leathery. *Seed* globose, entirely filling the cavity or its lower part; the placentas included within the cotyledons; testa membranous; cotyledons thick, very fleshy; radicle very small, inferior.—DISTRIB. About 10 species, in India, Malaya and the Malay Archipelago.

Corolla-lobes long, narrow; style very short; anthers included in the corolla-tube (Sect. 1. BRACHYNEMA, Griff.) .. .. 1. *S. ferruginea*.

Corolla-lobes ovate or oblong, broad; style long, exsert; anthers exsert (Sect. 2. EUSPHENODESMA, C. B. Clarke):—

Flower-heads 3-flowered, the 6 bracts small in flower, enlarged in fruit; branchlets and leaves glabrous or nearly so .. .. 2. *S. triflora*.

Flower-heads 7-flowered, the 6 bracts enlarged both at flowering-time and in fruit:—

Branchlets, leaves and inflorescence rufous-hirsute; calyx very hirsute .. .. 3. *S. barbata*.

Branchlets, leaves and inflorescence sparingly pubescent or glabrate; calyx nearly glabrous .. .. 4. *S. pentandra*.

1. SPHENODESME FERRUGINEA, Briquet in Engl. & Prantl Pflanzenfam. IV. 3A, 181 (1894). A shrub, probably climbing; branchlets and inflorescence rusty stellate-tomentose; branchlets obscurely quadrangular. *Leaves* chartaceous; ovate or elliptic, acute at apex, cuneate or obtuse at base; sparsely hispid-pubescent on the upper surface, especially on the nerves, softly ferruginous-tomentose on the lower; 3 to 5.5 in. long, 2 to 3.5 in. broad; midrib stout; main nerves 5 to 6 pairs, the lowest pair from close to the base, the next about .2 in. above it, both nearly straight to the margin and then along it, the rest curved to meet in a looped intramarginal nerve; transverse nervules irregular; petiole stout, .25 in. to .5 in. long. *Panicles* axillary or terminal, spreading, leafy, densely covered with tawny-yellow tomentum, the whole forming a thyrus 12 in. or more in length and about as broad; peduncles 2 to 3 in. long, 3- or 5-chotomous, the two lower branchlets short-peduncled with each a pair of capitate heads, the two upper long-peduncled and again branching; heads 7-flowered supported by 6 spathulate bracts .75 in. long and .25 in. broad; buds obovoid; flowers sessile. *Calyx* tubular, densely stellate-tomentose without, whitish-villous within, .25 in. long, 2-lipped, the lips variably lobed, usually the upper 2-lobed rather deeply cleft, the lower very minutely 3-toothed. *Corolla*-tube funnel-shaped, slightly curved, .3 in. long, tomentose without, densely villous within; lobes 5, 6 or 7, .2 in. long, linear or ligulate, twisted. *Stamens* included, inserted low down on the corolla-tube, usually somewhat irregularly but generally in 2 to 3 rows, if 3 rows and 7 stamens the upper row 3, the middle 2, the lower 2, these latter close to the base; filaments slender, glabrous, about .1 in. long; anthers reniform. *Ovary* columnar, glabrous; style extremely short; stigma very shortly bifid. *Fruit* not known. *S. microstylis*, Clarke in Hook. f. Fl. Br. Ind. IV. 600. *Brachynema ferruginea*, Griff. Notul. IV. 176.

SIAMESE STATES: Pungah, abundant! *Curtis* 2963; Tongka, fide *Curtis*.—DISTRIB. Burma (Moulmein & Mergui, *Griffith* (K.D.) 6007, *in part*; Tavoy, *Parish*), Siam (*Murton* 62).

The curious arrangement of the stamens inside the corolla-tube and the very short style are such well-marked characters that it would almost seem advisable to reconstitute the genus *Brachynema*, or else to bring together into one genus of 4 sections *Sphenodesme* with *Symphorema* and *Congea*. We are inclined to consider the latter the best course, but it should be done in discussing a Monograph of the Tribe rather than the few species found in a limited area.

2. SPHENODESME TRIFLORA, Wight Ic. t. 1478 (1850). A climbing (sometimes erect, *Kunstler*) shrub; branchlets dark brown, terete, rough with many small lenticels, a slight ring at the nodes. *Leaves*

chartaceous; lanceolate, bluntly acuminate at apex, cuneate at base; glabrous on both surfaces or the younger ones slightly velutinous; 3 to 5 in. long, 1 to 2 in. broad; midrib prominent beneath; main nerves 5 to 6 pairs, the lowest pair very inconspicuous, close to the margin, the next at about .25 in. from the base and  $40^\circ$  with the midrib, curving up to and along the margin, but not meeting the remaining 3 to 4 which curve at about  $50^\circ$  and meet in intramarginal loops; transverse nervules arched; reticulations netted; petiole .25 to .5 in. long, curved. *Panicles* very long, grey-pubescent, the lower branches leafy with ordinary leaves, the upper ones with gradually smaller leaves becoming bract-like; the branches very long, up to 2 ft., slender, scarcely 1 in. broad, bearing distant opposite pairs of 3-flowered capitate cymules each supported by a pair of reduced leaves and furnished with 6 spathulate bracts usually longer than the flowers and enlarging in fruit; flowers sessile, the corollas dark purple, the calyx and bracts dull red. *Calyx* tubular, 10-nerved, velutinous-pubescent without, densely villous within, .1 to .15 in. long; lobes 5, triangular, short. *Corolla* puberulous; tube cylindric, with a ring of hairs near the mouth within, .25 in. long; lobes 5, subequal, rounded. *Stamens* shortly exsert; filaments slender; anthers reniform, the cells somewhat divergent. *Ovary* pyriform, glabrous; style slender. *Drupe* ovoid or obovoid, sometimes constricted above, included in the enlarged prominently ribbed calyx, and supported by the 6 oblong-spathulate glabrescent enlarged bracts, which reach .5 to .75 in. long and .15 to .3 in. broad, and have 3 prominent nerves joined by transverse nervules; exocarp leathery. *Seed* 1, globose, completely filling the lower part of the cavity of the drupe, the upper part empty; cotyledons .1 in. in diam., including between them the remains of the placenta. Griff. Notul. IV. 182; Miq. Fl. Ind. Bat. II. 910; Clarke in Hook. f. Fl. Br. Ind. IV. 61. *Congea Jackiana*, Wall. Cat. 1735, partly.

PENANG: at Ayer Etam, 1000 ft., *Curtis* 210. PERAK: at Tapa and Jenah, *Wray* 683, 1383, 1752; at Gunting Bidai, *Ridley* 7598; at Salam, *Scortechini* 1119; in open jungle up to 500 ft., *Kunstler* (*King's Collector*) 160, 1098, 1623, 2474. SELANGOR: Semangko Pass, *Ridley* 12086, 12088. MALACCA: *Griffith* (K.D.) 6009, 1; *Maingay* (K.D.) 1196; at Sungei Udang, *Derry* 585. JOHORE: at Bukit Kayara, *Ridley* 11347. SINGAPORE: Kampar jungles, *Deschamps*.—DISTRIB. Sumatra (*Forbes*, 3083).

3. SPHENODESME BARBATA, Schauer in DC. Prodr. XI. 623 (1847). A climbing shrub; branches dark brown, rough, lenticellate; innovations, branchlets and inflorescence patently rufous-hirsute. *Leaves* chartaceous; elliptic or elliptic-oblong or elliptic-lanceolate, suddenly and



obtusely acuminate at apex, also mucronate, acute or somewhat rounded at base; sparsely tawny-villous on both surfaces when young, glabrescent when old except on the nerves; 2 to 4 in. long, 1 to 1·5 in. broad; midrib conspicuous, ending in the mucro; main nerves 5 to 6 pairs, the lowest pair almost from the base, the next a little higher up, the rest more distant, curving to join in an intramarginal nerve; transverse nervules few but prominent; petiole ·2 to ·3 in. long, twisted. *Panicles* in terminal racemes of heads or in single or few pedunculate axillary pairs of heads; the heads 7-flowered, each with 6 spatulate bracts reaching ·75 in. long and ·25 in. broad and prominently nerved; peduncles ·5 to 1·5 in. long, very slender; flowers sessile, corolla blue. *Calyx* campanulate, ·15 to ·2 in. long, densely long-rufous-hirsute without; lobes 5, short, triangular, each with often 1 or 2 subsidiary shaggy teeth. *Corolla*-tube cylindric, ·1 in. long, glabrous below, villous in a ring at the throat within; lobes subequal, ·125 in. long, oblong-spatulate, pubescent without. *Stamens* inserted in the throat of the corolla-tube, exsert; filaments slender, glabrous; anthers oblong, cells parallel. *Ovary* rounded, densely villous; style slender, as long as stamens; stigmatic lobes 2, very short. *Drupe* small, globose or ob-ovoid, included in the enlarged calyx, ferruginous-villous; exocarp crustaceous. *Seed* 1, globose, completely filling the cavity of the drupe; testa very thin; cotyledons thick, ·05 to ·1 in. in diam. Wight Ic. 1474 (*ferruginea*, R.W. in fig. 7); Miq. Fl. Ind. Bat. II. 910; Clarke in Hook. f. Fl. Br. Ind. IV. 601. *Congea barbata*, Wall. Cat. 1738.

PENANG: *Wallich* 1738; at Tulloh Bahang, *Curtis*; *Phillips*. MALACCA: *Griffith* (K.D.) 6009,2; *Maingay* (K.D.) 1194; *Hervey*.

4. SPHENODESME PENTANDRA, Jack in Mal. Misc. I. 19 (1820), and in Hook. Bot. Misc. I. 285 (1830). A climbing shrub; branchlets obscurely quadrangular, lenticellate, pubescent, dark brown. *Leaves* subcoriaceous; elliptic-oblong, -ovate, or -lanceolate, bluntly acute or acuminate often mucronate at apex, rounded at base; both surfaces glabrous when old, the upper shining, the lower pubescent when young; the nerves beneath generally pubescent; 2 to 7 in. long, 1 to 2·5 in. broad; midrib stout; main nerves 7 to 8 pairs, the lowest very thin and close to the margin, the next a little above, curving to and along the margin almost to the tip, the rest more distant, curving to meet in a prominent looped intramarginal nerve; transverse nervules many, nearly at right angles to the midrib; reticulations netted, prominent; petiole ·25 to ·5 in. long, pubescent, channelled, curved. *Panicles* axillary and terminal, many-flowered, somewhat puberulous, often racemose, leafy and reaching 6 to 15 in. in length; the capitate heads in opposite pairs on slender ·5 to ·75 in.

long peduncles; flowers in each head 7, supported by 6 oblong-spathulate, obtuse, nearly glabrous, bracts .75 to 1.25 in. long, .25 to .35 in. broad, and with about 6 prominent nerves and reticulations; flowers blue or purple with a yellowish calyx and pale yellow bracts. *Calyx* campanulate or funnel-shaped, usually prominently 10-ribbed, nearly glabrous, .25 in. long; when young with 5 short lobes and a mucro in the angles between them, when old with 5 prominent acuminate aristate lobes, and 5 aristate teeth in the axils; reticulately nerved in the upper half. *Corolla* tubular, the tube .2 in. long, densely villous within in the upper half, glabrous in the lower; lobes leathery, rounded, .05 to .1 in. long, obscurely in 2 lips, the midlobe of the lower lip recurved, the rest spreading. *Stamens* 5, inserted a little below the mouth of the corolla-tube, long-exserted; filaments slender; anthers oblong, the cells parallel. *Ovary* densely tawny-villous; style very long, slender; stigmatic lobes 2, spreading. *Drupe* the size of a pea, globular (*Roxb.*). *Seed* 1, conform to the drupe; cotyledons unequal. Wight Ic. t. 1475 (*S. Wallichiana*, Schauer in letterpress); Griff. Notul. IV. 181; Clarke in Hook. f. Fl. Br. Ind. IV. 602; Briquet in Engl. & Prantl Nat. Pflanzenfam. IV. 3A, 181, fig. 67 E, F. *S. Wallichiana*, Schauer in DC. Prodr. XI. 622. *S. Jackiana*, Schauer l.c.; Miq. Fl. Ind. Bat. II. 299. *S. acuminata*, Wight Ic. t. 1476 (*S. Jackiana*, Schauer in letterpress). *Roscoea pentandra*, Roxb. Fl. Ind. III. 54. *Congea pentandra* and *Jackiana*, Wall. Cat. 1734, 1735. *C. azurea*, Wall. Cat. 1733, partly. *Symphorema Jackianum*, Kurz For. Fl. II. 255.

JUNKSEYLOM or TONGKA: *Curtis*. KEDAH: Coah on Langkawi Island, *Curtis* 2522; *Ridley* 8320. PENANG: *Wallich* 1735, 1; *Curtis* 269. PROVINCE WELLESLEY: at Krian, *Ridley* 9391. PERAK: *Scortechini* 519; *King's Collector* (*Kunstler*) 3100, 4532, 7691, 10642. MALACCA: *Griffith*; *Maingay* (K.D.) 1195; *Cuming* 2388; *Derry* 40. PAHANG: *Ridley* 2160. JOHORE: at Bukit Sanga, *Ridley* 11122.—DISTRIB. India (Assam, Khasia Hills, Burma), Borneo.

#### 14. CONGEA, Roxb.

Large climbing shrubs, usually tomentose with mixed simple and stellate hairs. *Leaves* opposite, entire. *Inflorescence* of pedunculate, capitate, 3- to 9-flowered, involucrate cymes in large terminal panicles; the bracts at the base of the peduncles leaf-like, often white or coloured; the involucre of 3 or 4 elliptic or oblong or spathulate bracts connate at the base. *Calyx* tubular, funnel-shaped, slightly accrescent, 5-toothed. *Corolla*-tube slender, widening upwards, glabrate without,

usually villous within, 2-lipped; the upper lip of 2 lobes, the lower of 3, those of the upper lip the largest. *Stamens* 4 didynamous, inserted in the throat of the corolla, exsert; anthers oblong, the cells parallel. *Ovary* imperfectly 2-celled, 4-ovuled; ovules pendulous from the apex of the central placenta; style filiform, shortly bifid. *Drupe* small, obovoid, nearly dry, 1-seeded. *Seeds* conform to the drupe; testa membranous; cotyledons fleshy, unequal, enclosing the remains of part of the placenta; radicle very small, inferior.—**DISTRIB.** Four species, of Burma and Malaya.

Clarke in Fl. Br. Ind. says the drupes are 4-seeded, but every specimen we have examined affords one seed only, accompanied by the remains of the placenta and of 3 abortive ovules.

Involucral bracts reaching 1·5 in. by ·75 in., white-tomentose; leaves beneath and inflorescence more or less ferruginous-villous, and with about 5 to 6 pairs of main nerves	.. ..	1. <i>C. vestita</i> .
Involucral bracts reaching 1·25 in. by ·3 to ·4 in., pale lilac, tomentose; leaves beneath and inflorescence softly tomentose and with about 4 pairs of main nerves	.. ..	2. <i>C. tomentosa</i> .

1. *CONGEA VESTITA*, Griff. Notul. IV. 174 and Ic. Pl. Asiat. t. 458, fig. 21 (1854). A large climbing shrub; branchlets patently fulvous-hirsute, striate. *Leaves* submembranous; ovate or elliptic, sharply acute at apex, obtuse or shortly cordate at base; upper surface scabrous-pubescent, ferruginous-villous on the nerves, lower villous and grey-tomentose; 3 to 7 in. long, 1·5 to 3 in. broad; midrib slightly impressed above; main nerves about 5 to 6 pairs, curving upwards to and along the margin; transverse nervules many, but, like the reticulations, obscure; petiole ·25 to ·5 in. long, with long tawny hispid hairs. *Panicles* very large; bracts leaf-like, whitened; involucral bracts 4, very slightly connate at base, elliptic-obovate, often bifid at apex, reaching 1·5 in. long by ·75 in. broad, densely white-tomentose, with prominent reticulations and 3 pairs of main nerves; flowers rose-coloured. *Calyx* funnel-shaped, ribbed, ·25 to ·35 in. long, densely white-villous without and within; teeth 5, triangular, acuminate. *Corolla*-tube slender below, gradually widening upwards, ·3 to ·35 in. long, glabrous without, also within except a thick villous ring below the throat; upper lip of 2 ovate-oblong erect or recurved lobes, lower of 3 lobes half as long as the upper, the side lobes erect, the third lobe decurved, all thin, glabrous, with brown nervules. *Ovary* oblong-obovoid, glabrous except a few glands at the tip. *Drupe* nearly dry, obovoid. Clarke in Hook. f. Fl. Br. Ind. IV. 603.

PROVINCE WELLESLEY: Arakuda woods, *Ridley* 6993.—DISTRIB. Tenasserim.

2. *CONGEA TOMENTOSA*, Roxb. Cor. Pl. III. 90. t. 293 (1819). A large climbing shrub; branchlets densely tawny-tomentose. *Leaves* coriaceous; ovate, acute at apex, rounded at base; upper surface glabrous except on the nerves, lower tawny-tomentose; 2 to 4 in. long, 1 to 2.5 in. broad; midrib stout; main nerves about 4 pairs, curving upwards, joined by many regular transverse nervules; petiole tawny-tomentose, .25 in. long. *Panicles* terminal, reaching about 6 in. long and 9 in. broad, 3-chotomous, densely tawny-tomentose; branches long-(2 to 2.5 in.) peduncled, racemose, bearing pairs of heads on .5 in. long peduncles; bracts leaf-like, caducous; involucre bracts 4 to each head, pale lilac, ovate or spatulate, slightly emarginate, densely tomentose, .75 to 1.25 in. long, .3 to .4 in. broad, with 4 to 5 pairs of main nerves. *Calyx* funnel-shaped, densely villous especially within, .25 in. long; teeth 5, .05 to .1 in. long, triangular. *Corolla*-tube slender, slightly longer than calyx, glabrous except a ring of villous hairs at the throat within; 2-lipped, the upper lip long deeply bifid, the lower of 3 short lobes, the midlobe the longest. *Stamens* long-exsert. *Ovary* obovoid, pyriform, glandular at tip; style very slender; stigmatic lobes 2. *Drupe* obovoid, nearly dry; exocarp crustaceous, smooth. *Seed* 1, nearly filling the cavity of the drupe, with 3 abortive ovules; testa very thin; cotyledons thick, unequal, somewhat emarginate. *Wight* Ic. t. 1479, 2 or 1565; *Schauer* in DC. Prodr. XI. 623; *Kurz* For. Fl. II. 256; *Miq.* Fl. Ind. Bat. II. 911; *Clarke* in Hook. f. Fl. Br. Ind. IV. 603. *Roscoea tomentosa*, Roxb. Fl. Ind. III. 57. *Calochlamys capitata*, Presl Bot. Bemerk. 149.

SOUTH-WEST SIAM: at Poongah, *Curtis* 2903, 2962.—DISTRIB. India (Chittagong), Burma, Siam. Often cultivated.

The involucre bracts of our specimens do not agree very well with those figured in the 'Coromandel Plants,' but they agree better with the authentic specimens. We have not been able to make quite sure whether our specimens belong to type *tomentosa* or to the var. *azurea* (*C. azurea*, Wall. Cat. 1733), but we think to the latter.

The following species seems worthy of description here, as possibly also occurring in the Peninsula.

*CONGEA FORBESII*, King & Gamble in Kew Bull. 114 (1908). A large climber, spreading over great forest trees; branchlets rather slender, hoary-pubescent. *Leaves* chartaceous; oblong or oblong-lanceolate, shortly acuminate at apex, rounded and slightly cordate at base; upper surface shining, glabrous except the puberulous nerves; lower surface softly pubescent, reddish-brown when dry; 3 to 5 in. long, 1 to 1.5 in. broad; midrib strong, impressed above, as are the 5 to 6 pairs of main nerves which start at about 30° with the midrib and curve upwards to and along the margin; transverse nervules many, horizontal; reticulations netted; petiole .2 in. long, tawny-pubescent. *Panicles* terminal, tawny-pubescent, racemose, reaching about 12 in. in

SUMATRA: in deep forest. Lampongs, *Forbes* 1567.

15. AVICENNIA, Linn.

Leaves obtuse at apex; capsule over 1 in. long; corolla-tube distinct;  
stamens exsert; style long .. .. 1. *A. officinalis*.  
Leaves acute or acuminate at apex; capsule under 1 in. long; corolla-  
tube almost none; stamens included; style very short .. .. 2. *A. alba*.

1. *AVICENNIA OFFICINALIS*, Linn. Sp. Pl. 110 (1753). A small tree with greyish-brown thin bark and many blind root-suckers; branchlets pale brown, subquadrangular, glabrous when old; young ones, young leaves and inflorescence with very close pale tomentum. *Leaves* coriaceous; elliptic-oblong or obovate, obtuse at apex, attenuate at base; upper

surface glabrous, smooth and shining, lower surface pale and with a hard, very thin, grey or tawny tomentum, at length glabrate; 2 to 4 in. long, 1 to 2 in. broad; midrib stout; very prominent; main nerves 6 to 8 pairs, at first straight, then curving to anastomose near the margin; reticulations netted; petiole stout, .25 to .75 in. long. *Flowers* sessile, in small heads on rigid angular peduncles either 2 together in upper axils or several in short terminal thyrsi; bract and 2 bracteoles concave, thick, shorter than the sepals; flowers in each head 3 to 6; corolla orange-yellow. *Calyx*-segments thick, .1 to .3 in. long, ovate or suborbicular, scarious-ciliate on the margins, the lower part of the back pubescent, the rest glabrous. *Corolla*-tube very short, cylindric; lobes 4, ovate, acute or rounded at lip, subequal, .2 in. long, pubescent without, nearly glabrous within. *Stamens* exserted; filaments .1 in. long; anthers .05 in. long; cells parallel, ellipsoid. *Ovary* conoidal, tapering into the style, together .25 in. long; stigmatic lobes curved. *Capsules* 1 to 1.5 in. long, ovoid, compressed, beaked, green with greyish tomentum. *Seed* 1, completely filling the capsule. Schauer in DC. Prodr. XI. 700; Bedd. For. Man. in Fl. Sylv. CLXXIV., and Anal. Gen. t. 22, fig. 2; Brandis For. Fl. 371; Trimen Fl. Ceyl. III. 363; Clarke in Hook. f. Fl. Br. Ind. IV. 604; Miq. Fl. Ind. Bat. II. 912; Koord. & Val. Bijdr. VII. 217; Cooke Bomb. Fl. II. 435; Prain Beng. Plants 838. *A. resinifera*, Forsk.; Dcne. in Nouv. Ann. Mus. III. 402. *A. tomentosa*, Br. Prodr. Flor. Nov. Holl. I. 518; Roxb. Fl. Ind. III. 88; Wall. Pl. As. Rar. III. 44, t. 271; Wight Ic. t. 1481; Blume Bijdr. 821; Griff. Notul. IV. 185; Kurz For. Fl. II. 276. *Halodendron Thouarsii*, Roem. & Sch. Syst. III. 485. "*Mangium album*," Rumph. Herb. Amb. III. t. 76. "*Oepata*," Rheede Hort. Mal. IV. t. 45.

PENANG: Wallich 1742; Curtis 3533. MALACCA: Griffith (K.D.) 6069; Maingay (K.D.) 1208. SINGAPORE: T. Anderson 79; River valley road, Ridley 10370; Hullett 163.—DISTRIB. Coasts of India, Ceylon, Burma, Java, eastwards to the Pacific: in tidal creeks and on muddy coasts.

2. *AVICENNIA ALBA*, Blume Bijdr. 821 (1826). A shrub or small tree; branchlets pale brown, shining, obscurely quadrangular; innovations and inflorescence shortly appressed, whitish- or tawny-tomentose. *Leaves* coriaceous; lanceolate, acute or acuminate at apex, attenuate at base; glabrous on both surfaces or whitish-tomentose beneath (especially when young); 2 to 5 in. long, .75 to 2 in. broad; midrib prominent; main nerves 8 to 10 pairs, curving upwards to anastomose near the margin; secondary nerves few, meeting few arched transverse nervules, all somewhat raised on the upper surface; petiole thick, .25 to .5 in. long. *Flowers* sessile, either in small capitate heads or in distichous spikes in short terminal or axillary panicles; rachises and peduncles

angular; bract and 2 bracteoles concave, thick, shorter than the sepals, the bract orbicular, ciliate, the bracteoles ovate, ciliate, acute. *Calyx*-segments thick, .1 in. long, ciliate, slightly pubescent on the back near the base, above glabrous and rugose. *Corolla*-tube very short, sometimes almost none; lobes 4, ovate, concave, acute at tip, the posterior one sometimes bifid, .1 in. long, glabrous. *Stamens* included; filament .03 in. long; anthers .02 in. long, oblong; cells parallel. *Ovary* columnar, with very short conical villous style, together .05 to .1 in. long; stigmatic lobes 2, erect, thick, minute. *Capsules* .5 to .75 in. long, obpyriform, gibbous on one side, acute or acuminate; pericarp green (*Kunstler*) with greyish tomentum. *Seed* 1, completely filling the lower part of the capsule. Wight Ic. t. 1482; Miq. Fl. Ind. Bat. II. 913; Cooke Bomb. Fl. II. 436; Koord. & Val. Bijdr. VII. 221; Prain Beng. Plants 838. *A. officinalis*, Linn., var. *alba*, Clarke in Hook. f. Fl. Br. Ind. IV. 604. *A. resinifera*, Griff. Notul. IV. 186, and in Trans. Linn. Soc. XX. 6, fig. 1. *A. intermedia*, Griff. l. c. *A. officinalis*, Kurz For. Fl. II. 275.

PROVINCE WELLESLEY: in mangrove swamps, *Curtis*. DINDINGS: Pangkore, *Scortechini* 963. MALACCA: *Griffith* (K.D.) 6070, 6071; *Maingay* (K.D.) 1209. SINGAPORE: *Kunstler* (*King's Collector*) 1152. —DISTRIB. India, Burma, Java, Borneo, Celebes, to North Australia, in tidal creeks.

Koorders & Valeton draw attention to the capitate heads shown in Wight's drawing, and refuse to quote t. 1482. We have seen Koorders' Nos. 9696 and 22009 from Java, which have the heads spicate, as do *Kunstler*'s specimens No. 1152. *Haviland*'s Borneo specimens are partly spicate, partly capitate; *Scortechini*'s Pangkore specimens are capitate. But in all the structure of the flowers is the same and agrees with that given in Wight's drawing, so there seems no room for even a variety.

## ADDENDA-CORRIGENDA.

## VOL. LXXII. II. PART No. 14 (1903).

Page 113, line 21, for "inner" read "upper"

P. 114, l. 7, for "ovate" read "obovate"

P. 117, omit the whole of lines 7, 8 and 9.

P. 152, l. 4 from below, for "PERAKENSIS" read "PERAKENSE"

Pages 187, 188, omit the whole of 19, *TRISCIADIA*, Hook. fil.

## VOL. LXXIII. II. PART No. 15 (1904).

P. 51, l. 23, after "Wallich." insert "PERAK: Wray 2104, 3271; Scortechini; Ridley 8374; King's Collector 5508, 6431, 6545.—DISTRIB. Andaman Islands; Sumatra; Java, Forbes 2504."

P. 51, l. 11 from below, before "flowers" insert "greenish-white"

P. 52, l. 25, after "Flowers" insert "white, sweet-scented,"

P. 57, at top of page, insert "34. KNOXIA, Linn."

„ „ l. 3 from below, before "CANTHIUM" insert "35."

P. 59, l. 11 from below, for "Fruit when ripe . . . glabrous." read "Fruit oblong, obovoid, 1 in. long, yellow, pulpy, acid in taste."

P. 60, l. 20, for "Fruit unknown." read "Fruit black when ripe."

„ „ l. 5 from below, after "Fruit" insert "orange,"

P. 62, l. 20, for "my" read "our"

P. 64, l. 12, after "Flowers" insert "rosy-white, nearly 1 in. in diam.,"

P. 66, l. 2, after "bracteolate" insert " ; flowers green."

P. 67, l. 13, after "Flowers" insert "white,"

„ „ l. 7 from below, after "calyx;" insert "flowers white."

P. 68, l. 16, after "pubescent" insert " ; flowers white."

„ „ l. 2 from below, after "bracteoles" insert " ; flowers white."

P. 69, l. 18, after "base" insert " ; flowers white."

„ „ l. 4 from below, after "bracteolate" insert " ; flowers white."

P. 70, l. 15, after "linear" insert " ; flowers white."

P. 73, l. 3, after "bract" insert " ; flowers white."

„ „ l. 9 from below, after "Flowers" insert "red,"

P. 74, l. 22, after "long" insert " ; flowers white."

P. 75, l. 3, after "persistent" insert " ; flowers white."

„ „ l. 5 from below, after "tube" insert " ; flowers scarlet."



P. 78, l. 8, before "smaller" insert "white and "

P. 79, l. 6, after "shorter" add:—

"Mr. Ridley says this variety is *I. stenophylla*, Ridl. in Trans. Linn. Soc. Ser. 2, iii. 311 (1893), at any rate so far as the Pahang plant is concerned; he considers it a good species."

P. 79, l. 5 from below, after "minute" insert "; flowers orange."

P. 80, l. 5, for "SCORTECHINI" read "SCORTECHINII."

„ „ l. 15, after "puberulous" insert "; flowers red."

„ „ l. 12 from below, after "minute" insert "; flowers red, orange or yellow."

P. 81, l. 24, after "minute" insert "; flowers orange red."

P. 88, l. 7 from below, after "common" insert ", a sea-shore plant."

P. 89, l. 3 from below, after "flowers" insert "violet,"

P. 91, l. 8, after "long" add:—

"Mr. Ridley thinks it is a new species of *Timonius*."

P. 94, l. 9, after "Flowers" insert "pink,"

„ „ l. 5 from below, after "Flowers" insert "white,"

P. 95, l. 8, omit "*S. longicaulis*, Br. in Wall. Cat. 826."

„ „ l. 20, after "Flowers" insert "white,"

P. 102, after line 12 add as note:—

"Mr. Ridley remarks the occurrence of *Myrmecodia echinata*, Gaudich., which is not rare near the sea—PAHANG: Ridley 1462. SINGAPORE: Ridley 5869, 8067."

P. 105, l. 21, after "pedicels" insert ", white, bracts purple."

P. 106, l. 7, after "long" insert "ochre-yellow, honey-scented." and at line 11 after "Fruit" insert "bright light blue,"

P. 111, l. 20, for "*lucidus*." read "*Lowianus*."

P. 132, l. 3 from below, for "LUCIDUS" read "LOWIANUS"

P. 134, l. 15, for "BC." read "Blume"

# VOL. LXXIV. II. EXTRA NUMBER. PART No. 16 (1905).

P. 4, l. 8, for "Scandent" read "Erect"

P. 5, l. 12 from below, after "Fruit" insert "white, fleshy,"

P. 6, l. 5, after "Fruit" insert "white,"

P. 8, l. 23, for "climber" insert "plant, creeping on tree stems, often"

„ „ l. 6 from below, after "Fruit" insert "white, showy,"

P. 37, l. 20, after "obtuse" insert "; flowers lavender-coloured."

P. 39, l. 2, after "24" insert "; Hook. f. Fl. Br. Ind. III. 336;"; line 3, for "*Calcalia*" read "*Cacalia*"; and line 4 for "*El.*" read "*C.*"

P. 48, at the end of Order LXI. COMPOSITÆ, add:—

“Since the description of this Family was written, the following species have been noticed as additions to the Flora:

Tribe VERNONIÆÆ.

*Sparganophorus Vaillantii*, Gaertn. Fruct. II. 396 t. 165. A roadside weed, introduced from the West Indies, common in Singapore.—*Ridley, Deschamps.*

*Vernonia elæagnifolia*, DC. Prodr. V. 22. At Pekan, Pahang, fide *Ridley.*

Tribe ASTEROIDEÆ.

*Erigeron linifolius*, Willd. Sp. Pl. III. 1955. An escape or garden weed, common.—Penang, *Curtis* 3389, 3401.

*Grangea maderaspatana*, Poir.; DC. Prodr. V. 373. Kedah, *Curtis* 3809.

Tribe INULOIDEÆ.

*Blumea myriocephala*, DC. Prodr. V. 445. Selangor, *Curtis*, 2350.

*Cæsulia axillaris*, Roxb. Hort. Beng. 62, fide *Ridley.*

Tribe HELIANTHOIDEÆ.

*Enhydra fluctuans*, Lour. Fl. Cochinch. 511. Penang, *Curtis* 3455.

*Acanthospermum xanthioides*, DC. Prodr. V. 521. An introduced weed in Singapore, fide *Ridley.*”

P. 49, line 13, after “Flowers” insert “bright mauve,”

P. 53, l. 10, for “purple” read “pale blue”

P. 54, l. 24, for “adnatus” read “adnatum”

P. 55, l. 5 from below, omit “SINGAPORE; *Lobb.*”

„ „ lines 4 to 2 from below, omit “*Ridley* (Trans. Linn. Soc., &c. . . . common.”

P. 56, l. 14 from below, for “Salian” read “Tahan”

„ „ l. 4 from below, for “marcescent” read “acrescent”

P. 58, l. 19, at beginning insert “PROVINCE WELLESLEY: common.”

P. 61, l. 23, for “microphylla” read “microphyllum”

P. 64, l. 13 from below, for “white” read “pink”

P. 66, l. 11, after “shrub” insert “or small tree or an epiphyte on lofty trees”

P. 66, l. 14, after “paler” insert “often bright red when fresh”

„ „ l. 22, after “Corolla” insert “pink or white,”

P. 67, l. 29, after “long” insert “, pink, fragrant,”

„ „ l. 7 from below, after “Fruit” insert “black, edible,”

P. 72, at the end of *DIPLYCOSIA* add note:—

“*D. lancifolia*, Ridley in Journ. Str. Br. R. As. Soc. No. 39, 15 (1903) from Gunong Benom in Pahang, has been omitted.”

P. 91, at end of *GENTIANACEÆ* add note:—

“Ridley says that *Exacum tetragonum*, *Exacum pedunculatum* and *Canscora diffusa*, only admitted on the authority of Lobb's specimens which are of very doubtful locality, ought probably to be excluded. He would add *Limnanthemum cristatum*, Griseb. found at Singapore and at Batu Pahat river, Johore.”

# PART No. 17 (1905).

Page 123, line 5, after “*Berry*” insert “white,”

P. 131, last line, after “1808” insert “SINGAPORE: Changchukang, Ridley 3653, 3844 (*fide* Ridley).”

P. 171, line 28 after “101;” insert “Regensb. Fl. 578 (1855); Walp. Ann. V. 475. *Ceratophorus Leerii*,”; and line 31, for “King's Collector” read “Wray”

P. 175, l. 26, for “(?)” insert “about 20 feet high”; and last line, before “Ridley” insert “in the Bukit Kutu woods,”

P. 191, l. 10, after “60” insert “to 80”; and for “10 to 15 in.” read “3 to 4 feet.”

P. 193, ll. 18, 19, for:—

“It has . . . . is” read “old trees of any size have become scarce in a wild state, seedlings being still plentiful, but it is”

P. 196, l. 8, for “(?)” read “reaching 50 to 60 feet in height” and line 29, add:—

“The timber is heavy and is used in house-building (Ridley).”

P. 237, l. 1, after “144” insert “; Brand Monog. Sympl. 40.”

P. 254, l. 21, for “7348” read “7848.”

P. 257, last line but two add:—“Remarkable among Jasmines for having white instead of black fruit (Ridley).”

P. 272, l. 14, to note add:—

“Ridley says this is *Linociera lancifolia*, Ridley in Journ. Str. Br. R. As. Soc. No. 39, 14 (1903).”

# PART No. 18 (1905).

Page 280, line 14, after “sessile” insert “, white,”

P. 284, after line 12, insert note:—

“Ridley says that he found *Ehretia burxifolia*, Roxb. Cor. Pl. I. 42, t. 57 along the Rumpin River in Pahang. We have seen no specimens.”

Page 292, line 19, after "*Flowers*" insert "white,

P. 295, l. 4, after "*Wray 2580!*" put " ; " instead of " . " and for "*MALACCA: Bujong*" read "*Bujong Malacca,*"

P. 335, l. 13, add:—"Common on the sea-shore (*Ridley*)" and to the note after "*species.*" add :—

"*Ridley* writes that *Solanum mammosum*, Linn. Sp. Pl. 187 should be added as it is thoroughly established and a conspicuous feature of the scenery on waste ground in Selangor and Perak. It is also common in old tin mines. No specimens have been seen."

P. 339, l. 9, for "*C.*" read "*P.*"

P. 340, l. 15, to note add :—

"*Ridley* says the purple-flowered variety is by far the commonest, but is not wild and is found on waste ground only."

P. 340, last line but 2, for "*all*" read "*some of*" and after "*provinces*" insert "*sparingly,*"

P. 348, l. 20, delete "*Herpestris pygmaea*, Griff. Notul. IV. 104."

P. 348, l. 25, after "*Flowers*" insert "*violet with white throat,*"

P. 350, l. 8, for "*SESSIFLORA,*" read "*SESSILIFLORA,*"

P. 352, l. 4 from below, omit "*white or white and pink*" and after "*exserted*" add " ; tube and back of upper lip cherry red, lower lip white with a yellow central spot, stigmas yellow (*Ridley*)."

P. 354, l. 3, for "*ASIATICA*, Linn. Sp. Pl. 619" read "*ATROPURPUREA Ridley n. sp.*"

P. 354, lines 12 to 17, omit all the references.

P. ,, ,, 19, 20, omit "*DISTRIB. &c. to end.*"

P. ,, line 21, for "*BENTHAMIANA . . . . . 226*" read "*CÆLESTIS, Ridley, n. sp.*"

P. 354, lines 29 to 31, omit all the references.

P. ,, line 22, omit "*DISTRIB. &c.*"

P. 355, at the end of the genus *TORENIA* add note :—

"*Ridley* says that *T. Benthamiana*, Hance, is often cultivated but is not established. He also says that *T. mucronulata*, Benth. in DC. Prodr. X. 409 should be added with the following localities. PENANG: Waterfall and Government Hill, *Curtis*, 1837. TRENGGANU: Bundi, *Rostado*. DINDINGS: Gunong Tungul, *Ridley* 9444. PAHANG: at Tahan River, *Ridley*. SINGAPORE: Garden jungle, Bukit Timah, *Ridley* 6894."

P. 357, l. 8, after "*Corolla*" insert "*light blue,*"

#### PART No. 19 (1907).

Page 399, lines 23, 24, for :—

"But the author gives no explanation of his drawings," insert "and the author uses the term '*funiculus umbilicalis*.'"

P. 469, line 16, at the end change “.” to “;” and in line 17 omit “*S. caudatus*,”

P. 470, l. 15, for “193.” read “192.”

P. 532, l. 7 from below, for “*SELANGORICA*, King & Gamble, n. sp.” substitute “*CARNOSUM*, Merrill & Rolfe in Philipp. Journ. Sc. III. (1908) 121.”

P. 533, l. 9, after “all” add “*Oxystelma carnosum*, R. Br. Prodr. Fl. Nov. Holl. 462; Dene. in DC. Prodr. VIII. 543. *Cynanchum carnosum*, Schltr. in Perkins Fragm. Fl. Philipp. 120, *Vincetoxicum carnosum*, Benth. Fl. Austral. IV (1869) 331.”

Page 533, l. 11 at end, add “Australia.”

P. 543, l. 17, for “Patch” read “Pateh”

P. 546, l. 12, for “Hort. Ham.” read “Herb. Buch.-Ham.”

P. „ „ 4 from below, for “Tjuk” read “Ijuk”

P. 549, at end of *PERGULARIA* insert note:—

“According to N. E. Brown (Kew Bull. 323 (1907)) the generic name *Pergularia* really belongs to *Damia* and (This.-Dyer Fl. Cap. IV. i. 775) the species described under *Pergularia* must be renamed under *TELOSMA*, Coville.”

P. 554, line 19, omit “MALACCA: Griffith 3764.”

P. 574, l. 12, after “rounded” insert “or cuneate”

P. 579, lines 6 to 10, for “Wall. Cat. . . . . t. 4545” read “Lindl. Bot. Reg. (1847) t. 54; Hook. Bot. Mag. t. 4545; Wall. Cat. 8171; Dene. in DC. Prodr. VIII. 633; Miq. Fl. Ind. Bat. II. 513.”

P. 586, after line 7, insert note:—

“For a discussion of the curious modifications of the leaves of *D. Rafflesiana*, *D. complex*, and other species, see the following: Treub in Ann. Buit. III. 13; Scott & Sargent in Ann. Bot. VII. 243; This.-Dyer in Ann. Bot. XVI. 365; H. H. W. Pearson in Journ. Linn. Soc. XXXV. 376.”

#### PART No. 20 (1907).

Page 637, line 10 from below, for “T. Anders.” read “Wall.”

P. 641, l. 7, for “E” read “S”

P. 646, lines 12, 13, omit “*H. phlomoides*” and transfer “Miq. Fl. Ind. Bat. II. 779;” to after “DC. Prodr. XI. 90;”

P. 683, line 17, for “Wall.” read “Nees”

P. 700, last line of analysis, omit “18. *CYMARIA*” and insert

“Anthers 2-celled; upper lip of corolla merely notched	..	18. <i>CYMARIA</i> .
Anthers 1-celled; upper lip of corolla 2-lobed	.. ..	19. <i>ACRYMIA</i> .”

P. 701, line 4 from below, after “places” insert “PENANG: *Deschamps*. PROVINCE WELLESLEY: *Ridley* 7168. SELANGOR: at Kwala Lumpur, *Ridley* 10204. SINGAPORE: *Hullett* 63, 175.

ANDAMANS at Port Blair, *Kurz*, *King*, *Prain*. NICOBARS: Car Nicobar Moos, *King's Collectors*; Katchall, *Kurz*."

P. 702, l. 19, for "PERAK . . . . MALACCA" insert "PENANG: *Wallich* 2713 E; at Santong Sotong, *Curtis* 2492. DINDINGS: at Pangkore (marked ? introduced) *Scortechini* 1017. ANDAMANS: S. Andaman, *King*."

P. 702, lines 27 and 30, for "*graveolens*" read "*suaveolens*"

P. 704, line 4, for "PERAK: *Kunstler*" insert "KEDAH: Langkawi, on the small islands, *Curtis* 2577. PERAK: near Bernani River at 300 to 400 ft., *Kunstler* 8813."

P. 705, l. 10 from below, at end, insert "SINGAPORE: *Kunstler* 89."

P. 707, after "Provinces." insert "PENANG: *King*, *Deschamps*. PERAK: at Jenah, 200 to 300 ft., *Wray* 1759. MALACCA: *Griffith* 3957. SINGAPORE: *Wallich* 2733; *Schomburgk*."

P. 708, lines 19 and 20, for "SINGAPORE . . . . 7603!" read "PERAK: Upper Perak, *Wray* 4046; Rawang, *Ridley* 7603. PAHANG: Tahan River, *Ridley* 2131! MALACCA: *Griffith* 3966! SINGAPORE: *G. Thomson*; Bukit Panjang, *Ridley* 3951; Gunong Bintang, *Kunstler* 255"; and at line 22, after "cultivation," add "Sumatra (in Eastern Sumatra, *T. Daud-Herb. Ridley* 11336; at Kitta Djawar in open and sunny waste places in Lampongs, *Forbes* 1416A)."

P. 709, line 9, after "*Wray*" insert "1682."

P. 710, l. 28, for "In all the provinces" read "KEDAH: Langkawi *Curtis*. PENANG: Balick Polo Road, *Curtis* 868; *Deschamps*. PERAK: *Scortechini*. PAHANG: Katapong, *Ridley* 1286. MALACCA: *Hervey*; *Griffith*. JOHORE: Kwala Kanary, *Lake & Kelsall* 4028. SINGAPORE: *Kunstler* 128; *Hullett* 19; *T. Anderson* 148. NICOBARS: Kamorta, *Kurz*; Car Nicobar, *King's Collectors*."

P. 710, after line 28, at end of *DYSOPHYLLA* insert the following:—

2. *DYSOPHYLLA VERTICILLATA*, Benth. in Wall. Cat. 1544 (1828). An annual herb. *Stems* laxly branched, rarely simple, 6 in. to 3 ft. high, glabrous or nearly so. *Leaves* in whorls of 4–10, glabrous, linear, subacute, margin entire or obscurely toothed; 1–3 in. long, .15 to .25 in. wide; petiole short or 0. *Flowers* in villous or tomentose cylindric terminal spikes, 1–2 in. long, .2 in. in diam.; whorls of cymes close-set throughout. *Calyx* in fruit .08 in. long, campanulate; teeth subequal, triangular, stellately spreading. *Corolla* .08 in. long, pinkish; tube slender, hardly exserted; lobes pubescent. *Filaments* exserted, hairy. *Nutlets* ellipsoid. Benth. in Wall. Pl. As. Rar. I. 30, in Lab. Gen. & Sp. 159, and in DC. Prodr. XII. 157; Thw. Enum. Pl. Zeyl. 239 (in part); Hook. Fl. Br. Ind. IV. 639. *D. ramosissima*, Benth. in Wall.

Cat. 1543. *D. Benthamiana*, Hance in Ann. Sc. Nat. Ser. 5, V. 234. *Mentha stellata*, Lour. Fl. Cochinchina. 36. *M. verticillata*, Roxb. Hort. Beng. 44, and in Fl. Ind. III. 5. *Pogostemon verticillatus*, Miq. Fl. Ind. Bat. II. 965.

KEDAH: Langkawi, Coah, *Curtis* 2098! DISTRIB.—Throughout South Eastern Asia, and in Australia.

Page 714, line 15, for "PERAK: *Scortechini*" read "KEDAH: Kedah Peak, *Ridley* or *Curtis*. PERAK: Harans, *Scortechini* 788!"

P. 715, l. 6 from below, for "In all the provinces" read "SELANGOR: *Ridley* 7601. ANDAMANS: S. Andaman, *King's Collector*. NICOBARS: Nancowry, *King's Collector*."

P. 717, l. 26, after "escape" add "MALACCA: Bukit Bruang, *Hervey*."

P. 719. l. 10 from below, after "*Deschamps*!" add "; *Hullett* 9. PENANG: *Deschamps*. PROVINCE WELLESLEY: *G. King*. PERAK: *Thaipeng*, *Scortechini* 7, 482; *Telukanson*, *Ridley* 10769," and after "*Griffith*!" insert "ANDAMANS: S. Andaman, *King's Collector*."

P. 720, l. 23, after "1115!" insert "at Tanjong Joking, *Curtis* 2491; *Deschamps*. PROVINCE WELLESLEY: *Butterworth*, *G. King*. MALACCA: *G. King*"; and line 24, after "48!" insert "*Hullett* 9."

P. 721, l. 14, after "places" insert "SELANGOR: *Pudok*, *Goodenough* 10462. PAHANG: at *Pekan*, *Ridley* 1164."

P. 722, l. 17, after "7095!" insert "Larut at 500 to 1000 ft., *King's Collector* 2372."

P. 724, l. 18, after "*Wray*!" insert "*Goping*, *Kunstler* 467."

P. 725, l. 24, at beginning, insert "PAHANG: at Pulau Tawar, *Ridley* 2148, also at Kwala Tanbeling," and lines 26 to 31, omit "It has . . . . *Materials*" and add "*Ridley* has also collected in Johore at Bukit Saga (No. 11130) a plant, also with white flowers, which agrees with *G. oblongum* in every character except in having calyx-teeth much shorter than the tube."

P. 726, l. 3, after "1310!" insert "gathered in Botanic Garden, from a plant sent from Waterloo, Perak, *Curtis* 2166."

P. 727, after line 4, the end of LABIATÆ, insert the following:—

19. ACRYMIA, Prain in Kew Bull. for 1908, 114 (1908).

Undershrubs. Flowers small, in lax, many-flowered, peduncled, raceme-like, axillary cymes. Calyx erect, 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed; the tube in fruit urceolate; throat within naked. Corolla-tube slightly enlarged upwards, shortly exserted; limb 2-lipped; lower lip 3-lobed, spreading, the mid-lobe larger than the lateral; upper lip suberect, 2-fid, not arched.

*Stamens* 4, exserted, didynamous, the upper pair shorter; anthers 1-celled. *Disk* small, equal, entire. *Style-arms* unequal, the upper very short. *Nutlets* obovoid, rugosely pitted; hilum very large, lateral.—*DISTRIB.* Species 1, endemic.

The genus *ACRYMIA* is closely allied to *Cymaria*, with which it agrees as regards inflorescence and fruit, but from which it differs in having a 2-lobed upper lip that does not conceal the 1-celled anthers. Though much smaller, the corolla of *Acrymia* resembles rather closely the corolla of *Ajuga*, a genus in which the anther-cells, though usually discrete, are sometimes at length confluent. In habit, however, *Acrymia* is unlike either of the genera to which it is so closely allied, and recalls that met with in an Indian group of species belonging to the genus *Gomphostemma*, which includes *G. ovatum*, Wall., and *G. Mastersii*, Benth.

*ACRYMIA AJUGIFLORA*, Prain in Kew Bull. 115 (1908). A dwarf undershrub. *Stems* woody, prostrate and rooting below, 2–3 in. long, densely leafy above. *Leaves* opposite, petioled, elliptic, obtuse, crenate except the sometimes unequally cuneate, or occasionally subtruncate base; dark green above, paler beneath, fulvous-strigose on both sides, especially along the 5–7 pairs of main nerves and the secondary reticulate veins; 4·5–8 in. long, 2–3·5 in. wide; petiole 75–2 in. long, fulvous-strigose. *Cymes* dichotomously branching, with terminal flowers; flowers on the branches secundly arranged; main-peduncles strigose, slender, 75–1·25 in. long; bracteoles subulate, shorter than pedicels. *Calyx* in flower campanulate, 08 in. long, in fruit urceolate, 15 in. long, strigose on the nerves externally; teeth 5, equal triangular as long as the portion of tube above the constriction; pedicels slender, strigose, 07–1 in. long. *Corolla* white, 25 in. long, glabrous; tube shortly exserted; lower lip spreading, 3-lobed, mid-lobe obovate; upper lip suberect, 2-lobed, lobes oblong, hardly exceeding lateral lobes of lower lip. *Filaments* exserted, hirsute at base, glabrous elsewhere; anthers 1-celled. *Nutlets* obovoid, 02 in. long, wide-reticulate; at first sparsely pubescent, at length glabrescent.

*PERAK*: On limestone rocks, in dense jungle, 500–800 ft., *Kunstler* (*King's Collector*) 10709!

#### PART No. 21 (1908).

P. 795, l. 8, for "*SPHENODESMA*." insert "*SPHENODESME*."

*NOTE*.—Since the completion of the Families of the Gamopetalæ, a paper has been read before the Linnean Society by Mr. H. N. Ridley, F.R.S., on a "Collection of Plants made by Messrs. H. C. Robinson and L. Wray on Gunong Tahan, Pahang." It describes a number of new species, and should be consulted by all workers who may make use of the 'Materials for the Flora of the Malay Peninsula.' It was published in Linn. Soc. Journ. Bot. XXXVIII. 301 *et seq.* (1908).



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